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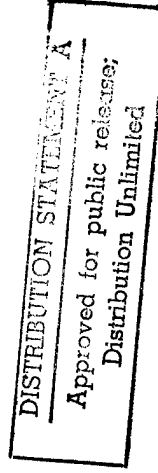
# Department of Defense FY 1998/1999 Biennial Budget Estimates

February 1997



DWG QUALITY INSPECTED 4

## RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSE-WIDE Volume 3 - Office of the Secretary of Defense



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COMBATING TERRORISM FUNDING SUMMARY

Office of the Secretary of Defense Research, Development, Test and Evaluation, Defense-Wide  
(Dollars in Millions)

Office of the Secretary of Defense/Washington Headquarters Services

<u>ID</u>	<u>Subactivity Description</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>
<u>BUDGET ACTIVITY 3: Applied Research</u>					
PE Number: 0603122D	Counterterror Technical Support	16.656	21.098	34.863	37.057
<u>BUDGET ACTIVITY 4: Demonstration/Validation</u>					
PE Number: 0603228D	Physical Security Equipment	19.096	23.198	31.553	32.536
TOTAL COMPONENT		35.752	44.296	66.416	69.593

February 1997



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Defensewide  
FY 1998/1999 R D T & E Program

Exhibit R-1

## Summary

Date: FEB 1997

Thousands of Dollars

	FY 1996	FY 1997	FY 1998	FY 1999
Summary Recap of Defensewide				
Defense Mapping Agency	71,685			
Special Operations Command	147,002	142,265	118,543	116,340
Chemical and Biological Defense Program	253,431	302,602	320,846	312,552
National Imagery And Mapping Agency				
Ballistic Missile Defense Organization	3,045,181	3,373,391	2,581,944	2,272,589
Office of Secretary/Defense	1,745,197	1,564,779	1,804,816	1,665,898
Defense Advanced Research Projects Agcy	2,269,202	2,140,436	2,206,403	2,271,934
National Security Agency				
Defense Special Weapons Agency	259,628	217,783	295,341	271,934
Defense Support Project Office	54,769	78,280	49,403	41,854
Joint Chiefs of Staff	5,526	35,836	67,189	59,924
Defense Information Systems Agency	60,630	65,802	55,845	57,980
Defense Intelligence Agency				
Central Imagery Office				
Defense Logistics Agency	74,479	83,848	102,166	89,157
Defense Investigative Service	402	412	419	418
Total Research Development Test & Eval Defwide	9,192,442	9,438,171	9,069,680	8,689,353

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Office of Secretary/Defense  
FY 1998/1999 R D T & E Program

Exhibit R-1

Appropriation: 0400 D Research Development Test &amp; Eval Defwide

Date: FEB 1997

Line No	Program Element Number	Item	Act	FY 1996	FY 1997	FY 1998	FY 1999 e
Thousands of Dollars							
1	0601101D	In-House Laboratory Independent Research	1	3,368	3,099	2,169	2,212 U
3	0601103D	University Research Initiatives	1	214,876	214,696	237,788	247,188 U
4	0601110D	Focused Research Initiatives	1	8,372			U
5	0601111D	Government/Industry Cosponsorship of University Research	1			14,713	15,544 U
Basic Research							
8	0602160D	Counterproliferation Support	2	13,599	217,795	254,670	264,944
10	0602227D	Medical Free Electron Laser	2	24,344	19,934	20,841	21,640 U
11	0602228D	Historically Black Colleges and Universities (HBCU) Science and Engineer	2	13,572	10,876	11,485	14,664 U
12	0602234D	Lincoln Laboratory Research Program	2	13,730	19,554	20,474	21,147 U
20	0602787D	Medical Technology	2	7,150	7,985	8,987	9,810 U
Applied Research							
22	0603002D	Medical Advanced Technology	3	72,395	58,349	61,787	67,261
23	0603104D	Explosives Demilitarization Technology	3	3,899	3,276	2,778	2,191 U
24	0603105D	Military HIV Research	3	14,265	11,754	12,259	12,541 U
25	0603120D	Demining	3	18,589			U
26	0603121D	Alternative to Landmines	3		14,369	7,663	7,592 U
27	0603122D	Counterterror Technical Support	3	16,656	21,098	2,990	4,977 U
28	0603160D	Counterproliferation Support - Adv Dev	3	61,680	57,108	34,863	37,057 U
30	0603225D	Joint DoD-DoE Munitions Technology Development	3	20,675	17,743	58,264	57,496 U
						16,141	16,354 U

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Office of Secretary/Defense  
FY 1998/1999 R D T & E Program

Exhibit R-1

Appropriation: 0400 D Research Development Test &amp; Eval Defwide

Date: FEB 1997

Line No	Program Element Number	Item	Act	FY 1996	FY 1997	FY 1998	FY 1999 c
Thousands of Dollars							
32	0603232D	Automatic Target Recognition	3		4,716	4,789	4,746 U
36	0603704D	Special Technical Support	3	16,895	17,252	11,750	11,896 U
39	0603716D	Strategic Environmental Research Program	3	54,436	53,475	54,874	57,185 U
40	0603726D	Joint Technology Insertion Program	3	3,228			U
41	0603727D	Joint Warfighting Program	3			14,172	22,833 U
42	0603728D	Agile Port Demonstration	3		4,897		U
43	0603729D	Rocket Launch Facility Upgrades	3		9,795		U
44	0603730D	Airfield Surface Traffic Monitoring	3		1,959		U
45	0603738D	Cooperative DoD/VA Medical Research	3	23,283	21,334		U
51	0603750D	Advanced Concept Technology Demonstrations	3	37,438	56,972	121,076	139,458 U
52	0603752D	Commercial Technology Insertion Program	3		9,744	47,889	47,457 U
54	0603755D	High Performance Computing Modernization Program	3	111,620	122,900	126,211	148,852 U
63	0603832D	Joint Wargaming Simulation Management Office	3	72,183	59,331	71,338	74,614 U
Advanced Technology Development							
67	0603228D	Physical Security Equipment	4	454,847	487,723	587,057	645,249
68	0603708D	Integrated Diagnostics	4	9,540	9,492	6,514	6,650 U
69	0603709D	Joint Robotics Program	4	21,038	29,159	23,196	24,694 U
70	0603714D	Advanced Sensor Applications Program	4	24,539	24,937	15,379	15,744 U
71	0603736D	CALS Initiative	4	24,476	15,527	1,916	1,899 U

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Office of Secretary/Defense  
FY 1998/1999 R D T & E Program

Exhibit R-1

Appropriation: 0400 D Research Development Test & Eval Defwide

Date: FEB 1997

Line No	Program Element No	Item	Act	FY 1996	FY 1997	FY 1998	FY 1999 c	Thousands of Dollars	
72	0603790D	NATO Research and Development	4	21,840	9,744	13,584	11,262	U	
73	0603851D	Environmental Security Technical Certification Program	4	25,257	21,587	15,164	17,422	U	
84	0603892D	ASAT	4	28,534	48,975			U	
		Demonstration and Validation							
86	0604160D	Counterproliferation Support - EMD	5	2,647	2,583			U	
88	0604771D	Joint Tactical Information Distribution System (JTIDS)	5	57,886	43,360	55,429	31,633	U	
96	0305889D	Counterdrug Intelligence Support	5	12,614				U	
		Engineering and Manufacturing Development							
97	0605104D	Technical Studies, Support and Analysis	6	73,147	45,943	55,429	31,633	U	
98	0605110D	Technical Support to USD(A)--Critical Technology	6	2,464	2,673	2,690	2,777	U	
100	0605117D	Foreign Material Acquisition and Exploitation	6	43,772	39,707	37,474	38,380	U	
102	0605128D	Classified Program USD(P)	6	3,700	11,108	5,979	1,692	U	
103	0605160D	Counterproliferation Support	6	6,322	8,343	7,047	8,508	U	
106	0605502D	Small Business Innovative Research	6	27,239				U	
108	0605710D	Classified Programs - C3I	6	424	2,252	357	448	U	
109	0605790D	Small Business Innovative Research Administration	6	1,456	1,586	1,738	1,859	U	
		RDTE Management Support							
124	0303140D	Information Systems Security Program	7	16,514	96,116	93,661	94,019	U	

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Office of Secretary/Defense  
FY 1998/1999 R D T & E Program

Exhibit R-1

Appropriation: 0400 D Research Development Test &amp; Eval Defwide

Date: FEB 1997

Program Line Element No	Item	Act	FY 1996	FY 1997	FY 1998	FY 1999	Thousands of Dollars
133	0305154D Defense Airborne Reconnaissance Program	7	600,653	469,335			U
136	0305190D C3I Intelligence Programs	7	11,077	6,899	6,249	6,242	U
137	0305204D Tactical UAVs	7			122,004	42,052	U
138	0305205D Endurance UAVs	7			216,712	167,864	U
139	0305206D Airborne Reconnaissance Systems	7			212,961	169,217	U
140	0305207D Manned Reconnaissance Systems	7			27,784	11,133	U
141	0305208D Distributed Common Ground Systems	7			37,653	33,897	U
142	0305209D DARP Management Support	7			21,543	22,180	U
	Operational Systems Development		628,244	476,234	644,906	452,585	
	Total Office of Secretary/Defense		1,745,197	1,564,779	1,804,816	1,665,898	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 1					R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	3.368	3.099	2.169	2.212	2.249	2.246	2.344	2.349	Continuing	Continuing
Project Name/No. and Subtotal Cost ILIR/P503	3.368	3.099	2.169	2.212	2.249	2.246	2.344	2.349	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification:

(U) This program element supports medical research of the Uniformed Services University of the Health Sciences (USUHS). The program is designed to answer basic medical questions of importance to the mission of the Department of Defense in the areas of Combat Casualty Care, Infectious Diseases, Neuroscience, Operational Medicine, and Systems Biotechnology. This appropriation is essential because the University does not have available to it the wide range of funding that typically supports medical school activities, such as endowments, state and local funds, hospital-related income, and research support from pharmaceuticals and other for-profit concerns. In addition, this program enables University scientists to contribute to enabling technologies supporting Defense Technology Objectives as a part of the DoD mission. Funds are competitively awarded to support multiple, basic research pilot studies which may lead to larger, more comprehensive projects funded by the military Departments or other governmental agencies.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 1	R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D	

PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1996 Accomplishments:

(U) Combat Casualty Care: Developed quantitative assay for low level messenger RNA in the facial motor nucleus, useful for studying effects of low power laser irradiation on nerve regeneration in vivo. Determined that the antibiotic, ciprofloxacin, is effective against common ocular pathogens causing endophthalmitis. Examined effects of growth factor on vascular smooth muscle cell growth. (\$.674 million)

(U) Infectious Diseases: Determined that mature T cells and B cells do not contribute to initial cytokine production in response to bacterial lipopolysaccharide, but may act as secondary producers of cytokines. Studied cytokine regulation during immune response to Brucella. Conducted population genetics studies of malaria vectors: detected no variation among 45 enzyme systems in 1,200 Anopheles darlingi mosquitoes from Belize and Brazil. Investigated regulation of B-cell maturation. Investigated persistence of antibody following immunization with hepatitis B vaccine. (\$.674 million)

(U) Neuroscience: Showed that the neurotransmitter, dopamine, inhibits pyramidal tract neurons in rat brain, modulating the pattern of sensory signals controlling skilled motor movements; both D1 and D2 receptor subclasses may mediate the dopamine effect. Studied mechanisms of plasticity of brain in recovering motor function in both congenital and acquired diseases. Examined impact of human stress and trauma on intracellular calcium regulation. (\$.673million)

(U) Operational Medicine: Developed and validated experimental techniques and computer algorithms to measure regional lung volume at different degrees of lung inflation. Investigated endocrine/immune interactions with exercise, and initiated characterization of peptide regulation of cardiovascular system with exercise. Determined that, following natural disasters, spouses of USAF hurricane group members were more distressed than were active duty members or their adolescent children. (\$.674 million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 1	R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D	

(U) Systems Biotechnology: Characterized structure of lipopolysaccharide core region isolated from Escherichia coli mutants;. Explored use of experimental chemotherapy for treatment of Chagas disease. (\$.673 million)

(U) FY1997 Plans:

(U) Combat Casualty Care: Study hypothermic ischemia and reperfusion injury in cardiopulmonary bypass. Study modulation of intracellular calcium signaling in endotoxic shock. Examine vascular effects of inflammatory mediators. Investigate mechanisms of interferon action. Investigate sphingomyelin metabolism and endocrine signaling systems in the rat. Investigate mechanisms of cytokine action in traumatic brain injury. (\$.621 million)

(U) Infectious Diseases: Elucidate mechanism of septic shock and endotoxin sensitivity in wound patients. Explore use of protein fusions to identify Shigella genes. Characterize induction of gametocytogenesis in malaria caused by Plasmodium falciparum. Initiate population-based human epidemiology studies of Bartonellosis in Peru. Compare efficacy of two inactivated hepatitis A vaccines in model systems. (\$.620 million)

(U) Neuroscience: Determine role of retinoid-induced pigment cells in vision photosensitivity. Characterize opioid receptor signal transduction; study activin and its inhibitors in nervous system induction. Study time-dependent model of acute and chronic traumatic stress disorders. (\$.620 million)

(U) Operational Medicine: Investigate regulation of peptide neurotransmitters of the cardiovascular system during stress. Continue investigation of endocrine and immune interactions with exercise. Characterize psychological and biological predictors of traumatic symptomatology. Study exercise and training practices impacting exertional heat illness in Marine Corps basic training. (\$.619 million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 1	R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D	

(U) Systems Biotechnology: Study regulation of thyroid gland function by atrial natriuretic peptide. Examine use of excision repair of UV-induced photo products. Determine nuclear localization of myti and myelin gene transcription. (\$.619 million)

(U) FY 1998 Plans:

(U) Combat Casualty Care: Investigate vascular effects of inflammatory mediators. Continue investigation of potential modulation of calcium in endotoxic shock. Examine estrogen regulation of vascular endothelial growth factor. Characterize peptidergic regulation of cardiovascular system during stress. Explore use of vascular closure staples versus sutures using porcine model. Analyze role of pH-regulated outer membrane proteins in gonorrhea. (\$.434 million)

(U) Infectious Diseases: Investigate role of macrophages in Venezuelan equine encephalitis using a molecular approach. Investigate role of opacity proteins in gonococcal infections. Study mechanism of block in transport of regulatory glycoproteins by interferon. Continue to characterize endotoxin sensitivity and resistance. (\$.434 million)

(U) Neuroscience: Investigate and characterize genetic bases of attention. Study neurocytokines and transmitter plasticity in visceral sensory nerve injury. Examine beta endorphin in the brain and peptide release from the pituitary gland. Further characterize neuroendocrine responses to exercise in regulating magnitude of the immune response. (\$.434 million)

(U) Operational Medicine: Investigate means of increasing military readiness: study skill-based treatment of pathological anxiety;. Continue to elucidate mechanism of retinoid-induced pigment cell photosensitivity. Continue investigation of endocrine and immune interactions with exercise. Continue study of exercise and training practices impacting exertional heat illness in Marine Corps basic training. (\$.433 million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA I	R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D	

(U) Systems Biotechnology: Continue study of regulation of thyroid gland function by atrial natriuretic peptide. Develop matrix to examine use of excision repair of UV-induced photo products. (\$.434 million)

(U) FY 1999 Plans:

(U) Combat Casualty Care: Investigate pharmacological intervention against vascular effects of inflammatory mediators. Investigate the use of calcium chelators for modulating endotoxic shock. Evaluate vascular closure staples and other innovative surgical techniques by comparison with suture technology in porcine models (\$.443 million)

(U) Infectious Diseases: Continue investigation of drug-induced macrophage mobilization in Venezuelan equine encephalitis. Perform cDNA characterization of opacity proteins in gonococcal infections. Develop cell culture and examine models to characterize response to endotoxin. Determine susceptibility of Anopheles vestipennis to Plasmodium vivax in Belize. (\$.443 million)

(U) Neuroscience: Investigate upregulation of transmitter plasticity in visceral sensory nerve injury. Investigate modulation of beta endorphin activity in the brain. Continue efforts to characterize neuroendocrine response to exercise. Investigate use of low power laser therapy in decreasing apoptosis in motor neuron axotomy. (\$.442 million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 1	R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D	

- (U) **Operational Medicine:** Identify parameters of skill development-based approach for anxiety reduction in military personnel. Investigate adjuvant therapies to compensate for immune modulation associated with exercise. Evaluate potential interventions for retinoid induced pigment cell photosensitivity. (\$.442 million)
- (U) **Systems Biotechnology:** Study pharmacokinetics of atrial natriuretic peptide control of thyroid gland function. Continue evaluation of use of excision repair of UV-induced photo producers (\$.442 million)

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
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Provide an acquisition strategy. Not applicable.

**(U) B. Program Change Summary**

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>Total Cost</u>
Previous President's Budget	3.411	2.154	1.116	.562	Continuing
Appropriated Value		3.154			
Adjustments to Appropriated Value					
a. Congressionally-directed undistributed reduction	(.043)	(0.55)			
b. Rescission/Below-threshold reprogramming			1.053	1.650	
c. Other			2.169	2.212	
Current Budget Submit/President's Budget	3.368	3.099			Continuing

Change Summary Explanation: Funding changes are due to program budget adjustments.

**C. Other Program Funding Summary** Not applicable.

**D. Schedule Profile** Not applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE					
RDT&E, Defense Wide/BA 1					UNIVERSITY RESEARCH INITIATIVE PE 0601103D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	214.876	214.696	237.788	247.188	255.577	261.301	267.241	272.991	Continuing	Continuing
URI/P103	196.246	198.546	227.788	237.188	245.577	251.301	257.241	262.991	Continuing	Continuing
DEPSCoR/P104	18.630	16.150	10.000	10.000	10.000	10.000	10.000	10.000	Continuing	Continuing

**A. Mission Description and Budget Item Justification****(U) BRIEF DESCRIPTION OF ELEMENTS:**

P 103, University Research Initiative (URI). The URI has three primary objectives: (1) to support basic research in a wide range of scientific and engineering disciplines pertinent to maintaining our military technology superiority; (2) to contribute to the education of scientists and engineers in disciplines critical to defense needs; and (3) to help build and maintain the infrastructure needed to improve the quality of defense research performed at universities. Paralleling these objectives, this project, in conjunction with the other project within this program element, competitively supports programs at universities nationwide in three interrelated categories:

- \* Research. The main thrust of the URI is multidisciplinary research, supported under the Multidisciplinary University Research Initiative (MURI). The MURI efforts involve teams of researchers investigating high-priority topics that intersect more than one traditional technical discipline; for many complex problems, this multidisciplinary approach serves to accelerate research progress and expedite transition of results to application. In addition, the URI supports single-investigator research efforts performed by outstanding scientists and engineers early in their independent research careers; this support is provided under Young Investigator Programs (YIP) through FY 1997 and the new Presidential Early Career Awards for Scientists and Engineers (PECASE) beginning in FY 1997.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		<b>DATE</b> February 1997
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-wide/BA 1	<b>R-1 ITEM NOMENCLATURE</b>	
	UNIVERSITY RESEARCH INITIATIVE PE 0601103D	

\* **Education.** The URI promotes graduate education in science and engineering for U.S. citizens through the National Defense Science and Engineering Graduate Fellowship Program and the Augmentation Awards for Science and Engineering Research Training (AASERT) program. The AASERT program awards research traineeships for graduate students and also supports laboratory experiences for undergraduate students on defense research projects.

\* **Infrastructure.** URI support for the development of research infrastructure responsive to defense needs includes three programs. The Defense University Research Instrumentation Program (DURIP) allows researchers to purchase more costly items of research equipment than typically can be acquired under single-investigator awards. The URI Support Program (URISP) broadens the base of academic institutions participating in defense research by involving institutions that historically have not received much defense funding.

P 104, Defense Experimental Program to Stimulate Competitive Research (DEPSCoR). The DEPSCoR further helps to build national infrastructure for research and education in defense-critical fields by involving institutions in states that historically have not received much Federal research funding. It is executed in coordination with state committees formed for the National Science Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 1	R-1 ITEM NOMENCLATURE UNIVERSITY RESEARCH INITIATIVE PE 0601103D	

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1996 Accomplishments:

\* Programmatic accomplishments:

- Research. Two competitions for MURI new starts were conducted by the Services, DARPA, and the Science and Technology Directorate of the Ballistic Missile Defense Organization (BMDO) to increase MURI's focus on high-priority research areas of multi-Service interest. For example, a MURI topic in the area of battlefield and humanitarian demining capitalizes on university capabilities to elucidate the basic science and engineering relevant to detecting, locating, and identifying mines remotely and neutralizing them quickly. The two MURI competitions led to 34 new efforts in demining and the following research areas: terrain feature data; automatic target recognition; biomimetics; corrosion; broad-band amplifiers; intelligent assistants and systems; active control of rotorcraft; armor materials; low-energy electronics; photonic band engineering; acoustic transduction; layered manufacturing; coastal marine boundary layer; nonlinear control of dynamic systems; compliant substrates; high-cycle fatigue; liquid crystalline polymers; mathematical infrastructure; ultra-lightweight materials; magnetic materials and devices; nondestructive evaluation; and three-dimensional visualization. Multiyear MURI efforts initiated in prior years also were continued. Numerous new awards were made under Young Investigator Programs, and efforts begun in prior years continued. (\$132 million)

- Education. Under the National Defense Science and Engineering Graduate Fellowship Program, 88 new graduate fellowships were competitively awarded for study leading to advanced degrees in science and engineering fields of importance to national defense. A competition under the AASERT program led to the award of research traineeships for more than 250 graduate students; the awards also support laboratory experiences for more than 60 undergraduate students in defense-critical fields; this level of effort about 40% less than the level at which the AASERT program was executed during FY 1991-1995, due to budgetary constraints associated with the FY 1996 appropriations. (\$41 million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 1	R-1 ITEM NOMENCLATURE UNIVERSITY RESEARCH INITIATIVE PE 0601103D	

- Infrastructure. More than 130 new awards were made under the FY 1996 DURIP competition, enabling the purchase of research instrumentation needed to sustain universities' capabilities to perform cutting-edge defense research; this level of effort was 30% less than the level at which the DURIP executed during FY 1995, due to budgetary constraints associated with the FY 1996 appropriations. Within the URI Support Program, eight new awards were made competitively in areas such as electronic and magnetic materials, image analysis, micromanufacturing, and neurodynamics. Fifty-nine (59) awards were made under the DEPSCoR program. (\$42 million)

## \* Selected technical accomplishments:

- Researchers at the North Carolina State University performed seminal work that underpins the controlled synthesis of wide-bandgap semiconductor materials and their use in high-temperature, high-power, high-frequency electronic devices for DoD applications such as compact radar systems and microwave sources. Six major accomplishments were:
  - Discovery of a way to grow diamond films with a sufficiently high degree of orientation to enable fabrication of rudimentary electronic devices for the first time.
  - Atomic-layer epitaxial growth of Indium Gallium Nitride films with single-atom thickness. The advance over previous methods, which could not produce film thicknesses less than 3-4 atomic layers, is important for laser applications.
  - Synthesis of the first Gallium Nitride (GaN) powders of sufficiently high purity to grow low-defect GaN boules.
  - Development and testing of a theory to explain the role of nitrogen and gallium vacancies as donors in GaN. This understanding enables one to use doping to vary from resistive to conductive limits in a controlled way, something that previously could be done only empirically.
  - Discovery of negative electron affinity in Gallium Aluminum Nitride with high aluminum content and demonstration of its use as a cold cathode. The bandgap of the cold semiconductor cathode can be adjusted in a controlled way, for the first time, thereby allowing density-modulated cathodes for more compact, more efficient microwave devices.
  - The first method for etching GaN controllably and at viable rates, using 193-nanometer light.

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- Scientists at Virginia Polytechnic University developed the first provably correct algorithm for use in optimal design computations for distributed-parameter systems that are governed by sets of coupled, nonlinear, partial differential equations. Previous methods for attacking these problems involved brute-force linking of computer codes for the physical phenomena (e.g., fluid dynamics codes to calculate lift and drag for flows past aircraft wings) with separate optimization algorithms (e.g., to calculate changes in lift and drag due to changes in wing shape). Those methods resulted in extremely complex and inefficient computations that often also failed to converge to a solution. The new algorithm can reduce computational times by ten-fold and, for the first time, allow a designer to select in advance a computational approach that is guaranteed to converge to the solution for a broad spectrum of systems of interest to the DoD. The method has been successfully used in optimizing design of shortened aircraft forebodies for wind tunnel testing of jet-engine inlets at the Air Force's Arnold Engineering and Development Center, as well as for problems involving nozzle design and aeroelastic tailoring to enhance aircraft lifetime.
- A URI program at Stanford University developed very small tactile-sensor arrays for robotic manipulators, for use in measuring distributions of forces generated in all three directions when a manipulator comes into contact with an object. The complex pattern of forces provides information on the softness, texture, and shape of the object being touched--for example, knowledge of the pattern of forces when a human hand or finger contacts an object helps one recognize an object from its feel and helps in handling the object (e.g., one can tighten one's hold of an object, when one senses shear forces that indicate the object is slipping out of one's grasp). The arrays are a major advance over previous sensors, which could determine force profiles in only one of the three dimensions. The sub-millimeter spacing of the sensors and linkage of the arrays with electronic circuitry provide good resolution of force profiles and will facilitate integration with manipulator control. This work is an important step in the drive to replace humans with robots for dangerous tasks, such as neutralizing mines and ordnance, or for tasks where visual sensing is impaired (e.g., underwater repairs, where water turbidity obstructs vision, or for systems maintenance where vision can be impaired by tight spaces and working around corners).

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- A researcher under the URI Young Investigator Program developed methods for synthesizing macromolecules that can be designed to: (1) bond tightly to segments of a specific microorganism's DNA; and (2) become highly fluorescent when they do so, thereby tagging that microorganism and providing a sensitive indicator of its presence. The tag molecules are a circular configuration of nucleotides, which gives them a very specific affinity for bonding to a particular microorganism's DNA, and not to others--the specificity to a particular microorganism of this technique is one thousand times greater than for previous techniques. This also is the first method that uses multiple tags that fluoresce, which gives a factor of 10 greater sensitivity than previous techniques for detecting microorganisms. This result offers great promise for future development of ultrasensitive methods for detecting threats posed by specific biological warfare agents.

**(U) FY 1997 Plans:**

- \* Research. Results of the source-selection process for initiating new MURI activities are expected to be announced in February 1997. New efforts will address the following areas: cluster-engineered materials; quasi-optic power combining; design and control of smart structures; dendritic polymers; air-plasma ramparts; cognitive workload; intelligent agents for wireless computing; advanced acoustic processes; photonics for radio-frequency systems; thermoelectric materials; and heterogeneous information systems. Fundamental advances in these areas will enable the development of new technologies applicable to a broad range of future military systems. The multidisciplinary nature of these areas, and their multi-Service relevance, make them ideally suited for inclusion under the multidisciplinary element of the URI. In addition to the new MURI efforts, multidisciplinary and young-investigator (including PECASE) programs begun in prior years will continue, with new competitive awards for PECASE programs (PECASE is the only young-investigator program that URI will support after FY 1997). Planned funding for this program category is less in FY 1997 than in FY 1996 or FY 1998 largely because nine, rather than twelve, months of funding are being provided for ongoing multidisciplinary research efforts, to eliminate forward financing and move anniversary dates for annual funding increments to the first quarter of each subsequent fiscal year. Following this one-time adjustment, twelve months of funding will be required in FY 1998 and FY 1999, to maintain the same level of effort for those continuing programs. (\$87 million)

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- \* Education. Approximately 90 new awards are anticipated to be announced in April, 1997, as the result of a competition under the National Defense Science and Engineering Graduate Fellowship program. The FY 1997 competition for the AASERT program, with awards to be announced in February 1997, is expected to lead to the award of research traineeships for more than 400 graduate students, and to support for the involvement of 50-100 undergraduate students in defense research; that will restore the AASERT program to the level of effort at which it was supported during FY 1991-1995. (\$60 million)
- \* Infrastructure. Under the FY 1997 DURIP competition, 273 awards were made for research instruments critical to the performance of defense research, bringing the DURIP program to the planned level of effort. Efforts begun in prior years under the URI Support Program will continue, with the next opportunity for new starts in FY 1999. A competition will be conducted under the DEPSCoR program, for which funds were identified by Congress, with awards anticipated to be announced in mid-summer 1997. (\$68 million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 1	R-1 ITEM NOMENCLATURE UNIVERSITY RESEARCH INITIATIVE PE 0601103D	

**(U)    FY 1998 Plans:**

\* Research. Topics for new MURI starts will include Gulf War Illness related university research and the priorities of DoD's Basic Research Plan, including: biomimetics, nanoscience, mobile wireless communications, and compact power sources. Biomimetics research will enable the development of novel synthetic materials, processes, and sensors through advanced understanding and exploitation of design principles found in nature, for military applications such as high-performance adhesives, and detection of mines and chemical/biological warfare agents. Nanoscience research is expected to enable dramatic, innovative enhancements in the properties and performance of structures, materials, and devices that have controllable features on the nanometer scale, for military applications such as ultrasmall, ultrafast computers; image information processors; and optical sensors for improved surveillance and targeting. Research in the area of mobile wireless communications will enable the rapid and secure transmission of large quantities of multimedia information over distributed networks, to significantly increase the capacity of the defense information infrastructure. Research focused on compact power sources will enable the identification and exploitation of new concepts for portable power generation; potential military applications include power sources for night vision equipment, portable communication systems, smart weapons, and satellites. In addition to the new MURI starts, multidisciplinary efforts and PE/CASE programs begun in prior years will continue, with new competitive awards. Funding in this category is more in FY 1998 than in FY 1997, largely because nine, rather than twelve, months of funding were provided for ongoing multidisciplinary research efforts in FY 1997, to eliminate forward financing and move anniversary dates for annual funding increments earlier in each fiscal year. Twelve months of funding still are required in FY 1998 to sustain the same level of effort for ongoing projects that received nine months of funding in FY 1997. (\$115 million)

\* Education. A FY 1998 competition will be conducted to award approximately 90 graduate fellowships under the National Defense Science and Engineering Graduate Fellowship Program. A competition under the AASERT program will award research traineeships for more than 400 graduate students. (\$60 million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 1	R-1 ITEM NOMENCLATURE UNIVERSITY RESEARCH INITIATIVE PE 0601103D	

\* Infrastructure. A DURIP competition will be conducted for new awards to support research instrumentation. Efforts begun in prior years under the URI Support Program will continue, with the next opportunity for new starts in FY 1999. There also will be a competition under the DEPSCoR program. (\$63 million)

(U) FY 1999 Plans:

- \* Research. Topics for new MURI starts will be selected in high-priority research areas such as advanced communications; information processing; and novel materials, devices, and structures concepts. Multidisciplinary and PECASE programs begun in prior years will continue, with new competitive awards under the PECASE program. (\$124 million)
- \* Education. A FY 1999 competition will be conducted to award approximately 90 graduate fellowships under the National Defense Science and Engineering Graduate Fellowship Program. A competition under the AASERT program will award research traineeships for more than 400 graduate students. (\$56 million)
- \* Infrastructure. A DURIP competition will be conducted for new awards to support research instrumentation. There will be new starts under the URI Support Program, and efforts begun in prior years will continue. There also will be a FY 1999 competition under the DEPSCoR program. (\$67 million)

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<b>(U) B. <u>Program Change Summary</u></b>	<b><u>FY1996</u></b>	<b><u>FY1997</u></b>	<b><u>FY1998</u></b>	<b><u>FY1999</u></b>	<b><u>To Complete</u></b>	<b><u>Total Cost</u></b>
Previous President's Budget	222.043	209.235	237.312	247.188	Continuing	Continuing
Appropriated Value		220.235				
Adjustments to Appropriated Value						
a. Congressionally-directed undistributed reduction	(7.167)	(5.539)				
b. Below-threshold reprogramming						
c. Other						
Current President's Budget	214.876	214.696	237.788	247.188	Continuing	Continuing

**(U) Change Summary Explanation:**

Funding: Funding changes due to program budget adjustments.  
Schedule: Not Applicable  
Technical: Not Applicable

**(U) C. Other Program Funding Summary Cost:** Not applicable.

**(U) D. Schedule Profile:** Not Applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997	
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Government/Industry Co-sponsorship of University Research PE 0601111D									
RDT&E, Defense Wide/BA 1											
COST (In Millions)		FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost		0	0	14.713	15.544	15.788	16.371	16.466	17.486	Continuing	Continuing
Project Name/No. and Subtotal Cost GICUR/P111		0	0	14.713	15.544	15.788	16.371	16.466	17.486	Continuing	Continuing

**(U) A. Mission Description and Budget Item Justification**

- (U) BRIEF DESCRIPTION OF ELEMENT:** The Government/Industry Co-sponsorship of University Research (GICUR) Program will create a shared commitment between industry and Government to promote and capitalize on university-based research, education, and training in technologies of strategic importance and areas of mutual interest. Due to strong industry support, semiconductor electronics is a leading focus area for this program to strengthen the university research environment. Expanding long-term semiconductor research is of strategic importance to the Government and the industry, to increase the knowledge base which will ultimately minimize the long-term vulnerability of this industry, support its long-term growth, infuse new ideas and approaches, and enhance national security. The overall goal is to create a shared commitment between the Government, industry and academia, to increase support and coupling to new, goal-centered, university-based, research organizations that provide a focus on ground-breaking research of a long-term time horizon, education, and training in semiconductor technologies. This commitment between industry and Government is a jointly contributed pool of funding and a shared management structure for sponsoring innovative university-based research centers in semiconductor electronics. Industry and Government share responsibility for research focus area selection and overall direction. This program leverages advances in information technologies and telecommunications to provide greater connectivity among the partners from the outset and enables the efficacious use of geographically distributed national resources. Efforts under this program will pursue multi-university research of a strategic direction with mechanisms for personnel exchange, and interactions to provide the continuing education of highly competent researchers in leading edge and emerging technologies. Based on inputs from the semiconductor industry and academia, the two technology area candidates of highest priority for the first focus centers are "Design" and "Interconnect." Design area challenges include convergence and verification of complex designs, accurate prediction of parasitic effects, trade-offs, and reuse of segments. Interconnect area research challenges include new materials and approaches to simplify and optimize back-end processing. Future semiconductor technology focus areas include Materials and Processes, Advanced Manufacturing, Patterning, and Packaging.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		<b>DATE</b> February 1997
<b>APPROPRIATION/BUDGET ACTIVITY</b>	<b>R-1 ITEM NOMENCLATURE</b>	
RDT&E, Defense Wide/BA 1	Government/Industry Co-sponsorship of University Research PE 0601111D	

Within the Government, the DoD has taken the lead in establishing Government/Industry Cooperative Research Centers in semiconductor electronics and is working in partnership with other agencies in different focus areas.

**(U) PROGRAM ACCOMPLISHMENTS AND PLANS:**

**(U) FY 1996 Accomplishments:**

**(U) FY 1997 Plans:**

**(U) FY 1998 Plans:** Obtain concurrence with and sign a Memorandum of Agreement between the Government and the industrial partners to establish the goals and management structure of the Government/Industry Co-sponsorship of University Research (GICUR) Program in semiconductor electronics. Jointly choose the first topic areas and determine the selection criteria for focus area centers. Solicit and evaluate proposals to establish university-based research consortia for selected focus areas. Establish university-based research consortia in technology focus areas. First two focus areas are likely to be Design and Interconnect. With industry and academia, jointly choose next topic areas for focus area centers. Potential topic areas in semiconductor materials and Processes, Patterning, Packaging, and Integrated Structures. Establish agreements with other industries, determine priorities and potential topical focus areas. Begin solicitation and evaluation of proposals for selected focus areas.

**(U) FY 1999 Plans:** Evaluate operation of first centers and set directions. Establish new university-based research consortia in selected technology focus areas of highest joint interest and priority to the industry and Government. With industry and academia, jointly choose topic areas and priorities for focus area centers and research support. Solicit and evaluate proposals as appropriate.

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RDT&E, Defense Wide/BA 1	Government/Industry Co-sponsorship of University Research PE 0601111D	

(U) B. Program Change Summary

Previous President's Budget

Appropriated Value

Adjustments to Appropriated Value

a. Congressionally-directed undistributed reduction

b. Rescission/Below-threshold reprogramming

c. Other

Current Budget Submit/President's Budget

Change Summary Explanation:

Funding: Funding changes due to program budget adjustments.

Schedule: Not Applicable

Technical: Not Applicable

(U) C. Other Program Funding Summary Cost Not Applicable

(U) D. Schedule Profile Not Applicable

<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>To Complete</u>	<u>Total Cost</u>
0	0	0	0	Continuing	Continuing
		14.713	15.544		
		14.713	15.544	Continuing	Continuing

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE February 1997

BUDGET ACTIVITY

## 2 - Applied Research

PE NUMBER AND TITLE

0602160D Counterproliferation Applied Research

PROJECT

P533

COST (In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
	P533 Counterproliferation Exploratory Development	13599	0	0	0	0	0	0	0	13699

**A. Mission Description and Budget Item Justification**

In August 1994, DoD established the Counterproliferation Support Program specifically to address the DoD shortfalls in counterproliferation operational capabilities documented in the May 1994 Report to Congress titled *Report on Nonproliferation and Counterproliferation Activities and Programs*. Counterproliferation Support Program funds are used to leverage DoD acquisition programs to meet the counterproliferation priorities of the Commanders-in-Chief (CINCs) of the Combatant Commands and accelerate the deployment of enhanced capabilities to the field. Specifically, the goal of the Counterproliferation Support Program is to improve specific military counterproliferation capabilities by (1) building on ongoing programs in the Services, DoD agencies, Department of Energy and U.S. Intelligence; (2) focusing on the most critical counterproliferation shortfalls to address major gaps in deployed capabilities (as reflected in the CINCs' priorities and the Counterproliferation Review Committee's (CPRC) prioritized list of counterproliferation Areas for Capability Enhancements); (3) leveraging existing program funding to more rapidly field capabilities by accelerating the deliverables of DoD programs; (4) identifying and enhancing the development of high payoff technologies to accelerate capabilities to the warfighter; (5) identifying and promoting key non-materiel initiatives that complement technological advances; and (6) transitioning Counterproliferation Support Program projects to the Services as soon as practicable.

In the FY 1996 DoD Appropriations Bill, Congress added \$4.5 million to this Program Element "... only for continuing research on and systematic monitoring of the proliferation of missile technology and biological, chemical and nuclear weapons."

**Project P533 - Counterproliferation Exploratory Development:**

This effort built on the Defense Special Weapons Agency (DSWA) core programs to develop weapon lethality and functional disruption data. Specifically, this research included R&D experiments; data analyses; model development; technology maturation and screening and demonstrations for identification, characterization and functional disruption or neutralization of Weapons of Mass Destruction (WMD) targets, including hardened facilities. The program evaluated and screened candidate technologies for the development of tactical unattended ground sensors (TUGS) for WMD facility identification, characterization and battle damage assessment (BDA). This effort addressed lethality from existing conventional weapons, including cumulative damage from multiple weapon attacks, tactics, or scenarios to extend target response models. Target response models were expanded to include additional target types. Collateral effects prediction codes were validated using existing data, code to code comparisons and special expulsion and atmospheric transport experiments. This effort included the Proliferation Path Assessment and Targeting System (PPATS) to assist in identifying critical steps in the proliferation process and aid in target identification. The culmination of these efforts resulted in the core technologies necessary to enhance and complement the Munitions Effects Assessment (MEA) targeting tool developed by DSWA to target WMD facilities.

Project P533

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Exhibit R-2 (PE 0602160D)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE
BUDGET ACTIVITY	February 1997	
2 - Applied Research	PE NUMBER AND TITLE 0602160D Counterproliferation Applied Research	
<p>The focus of this technology development was experimentation and operational demonstrations against full-scale simulated WMD targets. Unique or non-traditional tactics or weapon employment were investigated. Collateral effects issues were addressed. The data were used to validate preliminary MEA modules developed as part of the overall Counterproliferation Support Program. The data were also used to help define requirements for future weapons.</p> <p>As recommended by Congress in the FY 1996 National Defense Authorization Act, FY 1996 efforts also included \$1.2 million to explore the "deep digger" concept for hard target characterization.</p> <p><u>Acquisition Strategy:</u></p> <p><b>FY 1996 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>• 833 Initiated intermediate test series against simulated chemical production facilities.</li> <li>• 600 Developed sensor technology to help locate and characterize tunnels and other deeply buried targets.</li> <li>• 2900 Expanded ongoing experiments to validate collateral effects codes.</li> <li>• 2175 Expanded the MEA targeting tool to include additional WMD targets.</li> <li>• 640 Designed above-ground, full-scale, simulated WMD industrial targets for tests.</li> <li>• 1000 Initiated advanced penetrator risk reduction program.</li> <li>• 1200 Initiated exploration of the "deep digger" concept for hard target attacks.</li> <li>• 751 Completed nuclear proliferation path template for PPATS and initiated chemical and biological path development.</li> <li>• 1500 Initiated upgrade of existing ULQ-16 system currently onboard most Navy craft to accelerate the introduction of Specific Emitter Identification (SEI) capability onto ships and aircraft and improve the Navy's ability to identify, monitor and track ships suspected of transporting WMD or WMD related materials.</li> <li>• 2000 Conducted research for systematic monitoring of the proliferation of missile technology and WMD weapons.</li> </ul> <p>Total 13599</p> <p><b>FY 1997 Planned Program:</b></p> <ul style="list-style-type: none"> <li>• 0 No planned program--transitioned to Advanced Technology Development.</li> </ul> <p><b>FY 1998 Planned Program:</b></p> <ul style="list-style-type: none"> <li>• 0 No planned program--transitioned to Advanced Technology Development.</li> </ul> <p><b>FY 1999 Planned Program:</b></p> <ul style="list-style-type: none"> <li>• 0 No planned program--transitioned to Advanced Technology Development.</li> </ul>		

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Exhibit R-2 (PE 0602160D)

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1997

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

## 2 - Applied Research

0602160D Counterproliferation Applied Research

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## B. Project Change Summary

FY 1997 President's Budget  
Appropriated Value  
Undistributed Congressional Adjustments  
FY 1998 President's Budget

FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	Total Cost
13882	0	0	0	0	0	0	0	13882
14452	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
-853	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13599	0	0	0	0	0	0	0	13699

## C. Other Program Funding Summary

	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	To Complete	Total Cost
PE 0603160D, Counterproliferation Advanced Technology Development	61680	57108	58264	57496	59328	64726	66109	67662	Cont.	Cont.
PE 0204575N, Electronic Warfare Support (Operations & Maintenance)	0	491	489	487	485	483	494	504	Cont.	Cont.
PE 0204574N, Electronic Warfare Support (Procurement)	0	972	1927	2382	2836	3750	3833	3917	Cont.	Cont.

Project P533

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2					R-1 ITEM NOMENCLATURE Medical Free Electron Laser 0602227D					
Cost (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	24.344	19.934	20.841	21.640	22.338	22.961	23.451	24.002	Continuing	Continuing
Project Name/No. and Subtotal Cost MFEL/P483	24.344	19.934	20.841	21.640	22.338	22.961	23.451	24.002	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) **BRIEF DESCRIPTION OF ELEMENT:** The Medical Free Electron Laser (MFEL) Program seeks to exploit free electron laser technology for applications in medical, biophysical, and materials research. A key element of the program is assessing unique characteristics of free electron lasers (FELs) for applications in these areas. This is an Exploratory Development program under Budget Activity 2.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1996 Accomplishments:

(U) Medical research centers at Duke, Stanford, and Vanderbilt Universities; University of California, New England Medical Center, and Massachusetts General Hospital continued MFEL-related research in an effort to translate the outcome of basic science studies into clinical applications. Preclinical studies were conducted in several medical specialties, including ophthalmology, pathology, orthopedics, and otolaryngology. (\$13.494 million)

(U) Efforts were initiated to develop compact FELs suitable for use in a medical setting without special construction requirements. (\$1.9 million)

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Free Electron Laser	0602227D

- (U) A clinical facility at Vanderbilt University, allowing the use of FELs with human patients, was established. This facility is unique in the world. (\$3.0 million)
- (U) Researchers at Rochester, SUNY-Buffalo, Pennsylvania State, Utah, and Stanford Universities; and at UC Santa Barbara have discovered new mechanisms for energy transfer at the surface of materials irradiated with pulsed laser energy. This information is of interest to both the electronics industry and to biomedical scientists using lasers for ablative surgery. (\$1.7 million)
- (U) Basic biophysical mechanisms for coupling pulsed electromagnetic energy into acoustic energy in tissue were proposed and tested, using FEL radiation. (\$2.45 million)
- (U) Modes of cell injury and physiologic alteration in cell cycles were observed and controlled using FEL energy, as a prelude to new tissue-level diagnostics and treatments. (\$1.8 million)
- (U) **FY 1997 Plans:**
- (U) The medical research centers will continue MFEL-related research on new medical applications of pulsed, high-peak power radiation, including photons in both the X-ray and far UV regions of the spectrum, with an emphasis on procedures of high relevance to the military. (\$13.8 million)
- (U) Methods of enhancing reliability of FELs will be investigated and put in place to assure capacity for human use. (\$2.0 million)
- (U) Research to develop compact FELs for use in hospitals and battlefield settings will continue. (\$1.034 million)
- (U) Animal studies will be initiated for FEL procedures with military medical applications. (\$3.1 million)

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Free Electron Laser 0602227D	

**(U) FY 1998 Plans:**

- (U) Continue research on clinical procedures of relevance to military medicine, progressing to initial human clinical studies using an FEL. (\$11.041 million)
- (U) Demonstrate the first whole organ or whole animal imaging using tomographic techniques similar to MRI, but with UV or X-radiation generated on the Duke University storage ring. (\$2.9 million)
- (U) Develop novel spectroscopic techniques for remote detection of biological warfare agents. (\$1.1 million)
- (U) Produce the first X-ray holographs of biological crystals; this advancement could potentially revolutionize structural biology. (\$2.0 million)
- (U) Continue basic biomedical studies on mechanisms of light and tissue interactions. (\$2.8 million)
- (U) Continue research on unique solid state materials and their properties that give rise to surface properties, or strange magnetic behaviors that may be exploited for devices. (\$1.0 million)

**(U) FY 1999 Plans:**

- (U) Develop and test new procedures for treatment and diagnosis of medical conditions of particular pertinence to military medicine. Program funds also will be devoted to the transition of laser hardware technology developments to field applications. Expanded use of the FEL and FEL-related technologies for chemical and biological warfare defense will be facilitated by advances made in this medical research. (\$21.640 million)

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Free Electron Laser 0602227D	

<b>(U) B. Program Change Summary</b>	<b><u>FY1996</u></b>	<b><u>FY1997</u></b>	<b><u>FY1998</u></b>	<b><u>FY1999</u></b>	<b><u>To Complete</u></b>	<b><u>Total Cost</u></b>
Previous President's Budget	25.223	23.457	20.910	21.741	Continuing	Continuing
Appropriated Value		20.457				
Adjustments to Appropriated Value						
a. Congressionally-directed undistributed reductions		(.523)				
b. Below-threshold reprogramming						
c. Other	(.879)		(.069)	(.101)		
Current Budget	24.344	19.934	20.841	21.640	Continuing	Continuing
Change Summary Explanation:						
Funding:	Changes are due to Congressional and other minor program budget adjustments.					
Schedule:	Not Applicable					
Technical:	Not Applicable					

**(U) C. Other Program Funding Summary**      None.

**(U) D. Schedule Profile**      Not applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE					
RDT&E, Defense Wide/BA 2					Historically Black Colleges & Universities & Minority Institutions PE 0602228D					
COST ( <i>In Millions</i> )	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	13.572	10.876	11.485	14.664	15.140	15.563	15.896	16.269	Continuing	Continuing
Project Name/No. and Subtotal Cost HBCU/489	13.572	10.876	11.485	14.664	15.140	15.563	15.896	16.269	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) **BRIEF DESCRIPTION OF ELEMENT:** This PE provides infrastructure support in fields of science and engineering that are important to national defense. This competitive program provides support through grants or contracts for research, collaborative research, education assistance, instrumentation purchases, and technical assistance. The research grants are to further the knowledge in the basic scientific disciplines through theoretical and empirical activities. Collaborative research allows university professors to work directly with military laboratories or other universities. Education assistance funds are used by the selected institutions to strengthen their academic programs in engineering, science and mathematics, thereby increasing the number of under-represented minorities obtaining undergraduate and graduate degrees in these fields. Funds for instrumentation allow institutions to increase their capability to perform research of interest to the Department. Technical assistance funds are used to design programs to enhance the ability of minority institutions to successfully compete for future Defense funding.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE Historically Black Colleges & Universities & Minority Institutions PE 0602228D	

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY96 Accomplishments:

(U) Awards were made under the DoD Infrastructure Support Program for HBCU/MIs. The Army, Navy, Air Force, and the Advanced Research Projects Agency (ARPA) made awards for three types of programs. The Research Consortium Program, sponsored by the Army Research Office provides funding for two consortia in each of which a single HBCU/MI will form the "hub" of a structure which will include other research and educational organizations as satellite partners. The Instrumentation Program, sponsored jointly by the Office of Naval Research and ARPA, provides for the acquisition of research and educational-use instrumentation. Emphasis is on instrumentation which will enhance the ability of HBCU/MIs to perform research which is of interest to DOD and to increase the number of underrepresented minority graduates in the fields of science, engineering, and mathematics. The Centers for Future Aerospace Science and Technology, sponsored by the Air Force Office of Scientific Research, provides for the establishment of several centers selected from special topic areas.

(U) Awards were also made under the FY95 Supplemental Program to Establish Centers of Excellence for Science, Mathematics, and Engineering Education. The Program is designed to (a) enhance programs and capabilities at HBCU/MIs in scientific disciplines critical to the national security function of DoD and (b) to increase the number of underrepresented minority graduates in the fields of science, mathematics and engineering. (\$13.572 Million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE Historically Black Colleges & Universities & Minority Institutions PE 0602228D	

(U) **FY 1997 Plans:** Continue evaluation of the awards made with the prior year funds. In FY 1997 the HBCU/MI program will make additional awards using the program funds. These awards may be a combination of new starts, and continuations of some grants and other efforts started under previous fiscal years depending on technical progress. The Services will select the competitive awards from proposals submitted under the "Infrastructure Support Program for HBCU/MI's: FY97" broad agency announcement distributed in August 1996. (\$10.876 Million)

(U) **FY 1998 Plans:** Continue evaluation of the awards made with the prior year funds. In FY 1998 the HBCU/MI program will make additional awards using the program funds. These awards may be a combination of new starts, and continuations of some grants and other efforts started under previous fiscal years depending on technical progress. The Services and some Defense Agencies will select the competitive awards. (\$11.485 Million)

(U) **FY 1999 Plans:** Continue evaluation of the awards made with the prior year funds. In FY 1999 the HBCU/MI program will make additional awards using the program funds. These awards may be a combination of new starts, and continuations of some grants and other efforts started under previous fiscal years depending on technical progress. The Services and some Defense Agencies will select the competitive awards. (\$14.664 Million)

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<b>RDTE&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDTE&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE Historically Black Colleges & Universities & Minority Institutions PE 0602228D	

(U) Provide an acquisition strategy. Not applicable

(U) B. <u>Program Change Summary</u>	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>To Complete</u>	<u>Total Cost</u>
Previous President's Budget	14.195	11.163	14.526	14.736	Continuing	Continuing
Appropriated Value	14.195	11.163	14.526	14.736		
Adjustments to Appropriated Value						

a. Congressionally Directed undistributed reduction (.623) (.287)

b. Rescission/Below-threshold reprogramming

c. Other			(3.038)	(.069)		
Current Budget						
Submit/President's Budget	13.572	10.876	11.485	14.664	Continuing	Continuing

Change Summary Explanation:  
 Funding: Funding changes are due to Congressional undistributed reductions and program budget adjustments.  
 Schedule: Not Applicable  
 Technical: Not Applicable

(U) C. Other Program Funding Summary Cost Not Applicable

(U) D. Schedule Profile Not Applicable

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE								
RDT&E, Defense Wide/BA 2		Lincoln Laboratory PE 0602234D								
COST (In Millions)		FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Total Cost
Total Program Element (PE) Cost		13.730	19.554	20.474	21.147	21.614	21.888	22.356	22.881	Continuing
Project Name/No. and Subtotal Cost LL/P534		13.730	19.554	20.474	21.147	21.614	21.888	22.356	22.881	Continuing

**A. Mission Description and Budget Item Justification**

**(U) BRIEF DESCRIPTION OF ELEMENT:**

(U) The Lincoln Laboratory (LL) program is a high technology research and development effort conducted through a cost reimbursable contract with the Massachusetts Institute of Technology (MIT). LL is operated as a FFRDC administered by the DoD, and is unique among DoD FFRDCs. It has no funding sources other than the Line for its innovative research and development efforts. This is due to the fact that LL is operated by MIT at no fee and may not charge for IR&D (under A-21). Other DoD FFRDCs do charge a fee with which they may support research efforts.

(U) The LL Line funds research activities that directly lead to the development of new system concepts, new technologies, and new components and materials. Historically, the Line funding supported many development and demonstration programs which have led to such significant DoD systems as JSTARS, MILSTAR, GEODDs, as well as to solid-state devices and processes of major importance to the aerospace industrial base. In addition to being the foundation for many new LL programs, the Line also supports other ongoing Laboratory programs with state-of-the-art technology developments. The program has the following 4 research elements:

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 2	R-1 ITEM NOMENCLATURE Lincoln Laboratory PE 0602234D	

- 1) Target surveillance and recognition, with emphasis on the development and test of algorithms for automatic detection and identification of battlefield targets, such as theater ballistic missiles (TBM) and vehicles in the clear and in foliage;
- 2) Enhanced low-cost military communication systems, with emphasis on new antenna technology, protocols, compact low power hand held transceivers, and unmanned air vehicle (UAV) based systems for improved, mobile battlefield communication;
- 3) Advanced combat support technologies for combat identification (CID) and biological agent detection, with focus on micro-UAVs for battlefield surveillance/CID and technology for compact biological agent detection systems; and
- 4) Revolutionary, advanced electronic/optical technology, with specific emphasis on 3-D imaging focal plane arrays for advanced missile seekers, mid-infrared semiconductor lasers to counter advanced heat seeking missiles, and new miniature sensors for detecting and identifying biological agents.

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<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-wide/BA 2	<b>R-1 ITEM NOMENCLATURE</b> Lincoln Laboratory PE 0602234D	

**(U) PROGRAM ACCOMPLISHMENTS AND PLANS:**

**(U) FY 1996 Accomplishments:**

**(U) Target Surveillance and Recognition: (\$3.757 million)**

**(U) Surface Surveillance:**

Continued the advanced processing technology program to detect and identify time-critical targets. Modified the airborne data collection system to allow multi-frequency operation. Demonstrated improved target classification performance using high definition imaging (HDI). Continued development of techniques to identify classification features using high definition imaging (HDI). Continued development of techniques to identify classification features using high definition vector imaging (HDVI) techniques. Developed a framework to establish fundamental bounds for target classification, and demonstrated bounds on simple targets.

**(U) Space Surveillance**

**(U)** Continued the advanced electro-optical technology program in support of the Air Force Space Control Mission, particularly relevant to both earth-based and space based surveillance platforms.

**(U)** Progress was made in mid wave infrared (MWIR) focal-plane technology (PtSi) and visible band charge-coupled device (CCD) focal-plane technology for application to Space and Missile Defense and Space Surveillance. MWIR (PtSi) devices have been operated with in-pixel charge skimming. This is necessary for the development of focal planes and processing to greatly increase dynamic range, and reduce weight and power required by future Air Force electro-optical space sensors. Extremely large, 1960 x 2560 pixels, back illuminated visible band CCD arrays have been successfully fabricated and fully tested with good yield. These arrays will be used as detectors in the Air Force Ground Based Electro-Optic Deep-Space Surveillance (GEODSS) Upgrade Program.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 2	R-1 ITEM NOMENCLATURE Lincoln Laboratory	
	PE 0602234D	

(U) **Military Communications:** (\$2.479 million)

(U) Continued to investigate globally-networked military communications systems that will enable the free flow of information among disparate users and systems at rates from tens of megabits per second to tens of gigabits per second. Technology is under development for both free-space optical communications and terrestrial fiber communications, as well as for tactical theater communications (particularly to forces on the move), and for the interconnection of satellite communications (SATCOM), terrestrial and wireless systems.

(U) Global ultra-high-rate networks: Developing optical technology for ultra high-speed local area networks (LANs). Demonstrated the generation and propagation of 100 Gbps soliton optical pulses, 40 GHz optical memories and all-optical switches.

(U) Tactical Satellite Terminals: Continued development of electronically-steered phased array antennas utilizing optical-fiber and electro-optical technologies that offer light weight, low-cost fabrication and integration on tactical platforms. Fabricated and tested a four-element transmitter array at 8 GHz and began development of a receive array.

(U) **Combat Support Technology:** (\$2.257 million)

(U) Continued to work with the services and the DoD to develop, evaluate, and transfer to the services advanced Combat Support Technology (CID) techniques and technologies.

(U) Data gathered in All Service Combat Identification Evaluation Team (ASCIET) 95 and the Army's sanctioned battlefield simulation (CASTFOREM) was used to evaluate non-imaging infrared (NIIR) techniques for non-cooperative identification of ground targets.

(U) New Ultra High Range Resolution (UHRR) techniques for air vehicle identification have been developed and evaluated using software bandwidth extrapolation techniques to increase the resolution of existing sensors and advanced scattering center identification techniques.

(U) Initial steps have been completed toward the use of evolving laser and detector technology for new laser scattering and 3-D imaging techniques for air and ground target identification.

(U) Support was provided to ASCIET 96 combat identification (CID) tests and the joint U.S./Allies study on cooperative air vehicle identification options.

(U) A study of CID architectures applicable to Air Defense was completed.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 2	R-1 ITEM NOMENCLATURE Lincoln Laboratory PE 0602234D	

(U) Advanced Electronics Technology: (\$5.237 million)

(U) The general objective of this program is to conceive, demonstrate, and provide advanced electronics devices, circuits and subsystems for Air Force and other DoD systems, and to transfer such technologies to industry. Principal efforts are in lasers, electro-optic devices, optical and infrared sensor arrays, analog and digital silicon integrated circuits, high-speed microwave and mm wave devices, and superconducting electronic devices along with supporting development of materials and processing techniques. These efforts support Lincoln Laboratory programs of the DoD as well as Air Force Electronic Systems Center (ESC) (GEODSS upgrade), Phillips Laboratory (IR countermeasures, adaptive optics and speckle-imaging systems), and Rome Laboratory. Technology from this program is exploited by the U.S. Army Theater High-Altitude Area Defense (THAAD) program (IR focal planes), by U.S. Army Edge Wood Research Development and Engineering Center (ERDEC) (bi detectors), by DARPA (sub-0.25um lithography, flatpanel and helmet mounted displays), and by the Navy (vacuum-microelectronic 10-GHz sources). Technology transfer is being accomplished through direct DoD support (IR sensors, flat panel display technology, vacuum microelectronics, IR countermeasures, CCD signal processing, 193-nm lithography, and superconductive materials) and through cooperative research development agreements (CRDAs) (flat-panel display and lithography technology).

(U) Selected accomplishments: (1) Demonstrated low-power CCD analog-to-digital converter for integration with focal plane arrays; (2) Developed 1.5-um tapered lasers for high-speed optical switches and fiber communications; (3) Began development of room-temperature GaN-based visible/UV diode lasers for optical storage devices and chemical sensing; (4) Demonstrated >1-GHz clock-rate SOI/CMOS test circuits for signal-processing applications; (5) Developed CCD images for night vision demonstration; (6) Developed adaptive display algorithms for wide dynamic range Lincoln Laboratory low-light CCD sensors; (7) Improved color night-vision algorithms for fusing low-light visible and long wavelength infrared images; (8) Demonstrated low phase-noise tunable microwave source using a photomixer with a stable two-frequency laser; (9) Developed and fielded mid-IR semiconductor laser for IRCM tests; (10) Developed miniature IR, visible and UV lasers for ranging and bi detection; and (11) Successfully field tested a UV-laser-based bio aerosol fluorescence sensor.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 2	R-1 ITEM NOMENCLATURE Lincoln Laboratory PE 0602234D	

(U) FY 1997 Plans:

(U) Target Surveillance and Recognition: (\$5.343 million)

(U) Surface Surveillance:

(U) Continue the advanced processing technology program to detect and identify time-critical targets. Continue development of HDVI techniques with improved EM models and new primitives. Design high definition vector imaging (HDVI) algorithms to work within constraints of advanced synthetic aperture radar systems (ASARS), TIER 2+, and TIER 3- operational modes. Continue data collection on ground targets to develop Automatic Target Cueing techniques to benefit ASARS, and Defense Airborne Reconnaissance Office (DARO) UAV activities. Modify the airborne data collection system to facilitate moving target indication (MTI). Continue development of automatic recognition (ATR ) performance bounds and apply to fundamental sensor trade analyses.

(U) Space Surveillance:

(U) The primary work will be on focal plane processing, including on-chip analog-to-digital conversion and image feature detection in PtSi arrays. New techniques for improved radiation hardness for both visible and IR band CCD arrays will be developed and tested for space sensor applications.

(U) Military Communications: (\$3.512 million)

(U) Continue to investigate technology for global high-rate military communications networking at rates from tens of megabits per second to tens of gigabits per second, including optical communications and tactical theater communications (particularly to forces on the move). Global ultra-high rate networking: Continue development of 100 Gbps LAN technology utilizing soliton optical pulses. Complete development of 100 Gbps optical memory. Develop and demonstrate networking techniques and protocols for interconnection of disparate military communications systems. Tactical Satellite Terminals: Continue development of optically-controlled phased array antennas. Fabricate and test a 4-element receive array. Demonstrate technology for integration of transmit and receive arrays.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 2	R-1 ITEM NOMENCLATURE	
	Lincoln Laboratory PE 0602234D	

**(U) Combat Support Technology: (\$3.257 million)**

(U) Continue to work with the services and the DoD to develop, evaluate and transfer to the services advanced technology to support combat forces. FY97 efforts address combat support in three areas: Combat Identification, Biological Agent Detection, and Microsystems. In the Combat Identification area, Radar Signature Modulation (RSM) as well as antenna scattering for non-cooperative air vehicle ID will be investigated and multi-sensor fusion techniques will be analyzed. In the area of Biological Agent Detection we will continue to develop and test the UV fluorescence biological agent sensor, including field measurements and aerosol chamber tests. FY97 efforts in the Microsystems Area will focus on the preliminary design of a six inch fixed wing micro air vehicle, including an electro optical sensor suite and communications for covert short range surveillance in support of small tactical units.

**(U) Advanced Electronics Technology: (\$7.442 million)**

(U) Develop compact, tunable microwave filters using ferrites and high temperature superconductors. Improve resolution of CCD analog-to-digital converter to 14-16 bit accuracy and begin development of merged complementary metal-oxide semiconductor/charged coupled device (CMOS/CCD) process for imagers with on-chip conversion. Demonstrate high-power GaN microwave FETs. Improve performance of GaN ultra-violet (UV)/visible diode lasers. Develop focal planes enabling 3-D imaging for seekers and Combat Support Technology. Develop radiation-hard circuits in collaboration with other DoD laboratories. Continue development of ultra-low-power semiconductor-on-insulator/complementary metal-oxide semiconductor (SOI/CMOS) signal processors for airborne and space applications. Flight demonstration of highly stable narrow-linewidth terahertz photomixer source. Develop compact bio-aerosol sensor based on a miniature 266-nm UV laser. Upgrade power, brightness and operation temperature of mid-IR lasers for IRCM. Continue development and real-time implementation of neural net-based algorithms for IR and low light visible sensor data fusion algorithms. Initiate development of real-time network intrusion detection monitoring and selective information capture techniques. Begin development of new robust protocols for reliable distributed C4I systems.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 2	R-1 ITEM NOMENCLATURE Lincoln Laboratory PE 0602234D	

(U) **FY 1998 Plans:**

(U) **Target Surveillance and Recognition: (\$5.593 million)**

(U) **Surface Surveillance:**

(U) Continue the advanced processing technology program to detect and identify time-critical targets. Test HDVI, coupled with target cueing, and moving target imaging techniques, with ASARS, TIER 2+ and TIER 3- data as well as with data from Lincoln Laboratory airborne data collection system. Extend ATR bound formalism to more realistic search scenarios.

(U) **Space Surveillance**

(U) Work will continue in developing radiation hardened arrays in both the visible and IR (PtSi) band CCD arrays. On-focal plane processing, specifically in-pixel, on focal plane signal processing, will be developed for visible band CCDs.

(U) **Military Communications: (\$3.676 million)**

(U) Continue to investigate the technology of global high-rate military communications networking, including optical communications and tactical theater communications (particularly to forces on the move). Continue development and demonstration of networking techniques and protocols for inter-networking communications systems. Complete demonstration of sub-scale optically-controlled phased array antenna system by fabricating a combined transmit and receive array; transfer technology to industry.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		<b>DATE</b> February 1997
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-wide/BA 2	<b>R-1 ITEM NOMENCLATURE</b> Lincoln Laboratory PE 0602234D	

**(U) Combat Support Technology: (\$3.412 million)**

**(U)** Work begun in FY97 in each of the three areas (Combat Identification, Biological Agent Detection and Microsystems) will continue in FY98. Advanced techniques for multi sensor fusion will be developed in support of Combat Identification. Miniaturization of an advanced ultra violet bioagent detector will be initiated and field tests and chamber measurements will continue. A detailed design of the six inch micro air vehicle will be completed and preparation for fabrication, including laboratory testing of components, will be accomplished.

**(U) Advanced Electronics Technology: (\$7.793 million)**

**(U)** Demonstrate wideband microwave compressive receiver with superconductive filters and SOI/CMOS processors. Develop GaN UV diode lasers for compact environmental and biosensors. Develop high-power microwave GaN FETs for specific applications in radar and communications. Develop subsystems based on high-power solid state microwave sources for radars and communications. Improve sensitivity and increase size/number of pixels of visible, UV and IR focal planes. Demonstrate CCD advanced integrated visible sensor with on-chip digital outputs. Develop technology for compact bio-detector with discrimination and identification capability. Transition mid-IR semiconductor laser technology to industry for operational systems. Continue development of advanced techniques for real-time network monitoring and intrusion detection using rule-based, statistical and neural net classifier technology. Exploit distributed state consistency techniques for improved robust protocols in distributed C4I systems.

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	<b>R-1 ITEM NOMENCLATURE</b> Lincoln Laboratory PE 0602234D	

**(U) FY 1999:**

**(U) Target Surveillance and Recognition: (\$5.775 million)**

**(U) Surface Surveillance:**

**(U)** Continue the advanced processing technology program to detect and identify time-critical targets. Collect data to support algorithm transition to operational sensors. Operate airborne data collection system in concert with operational sensors to support development of robust multi-platform surveillance architectures.

**(U) Space Surveillance**

**(U)** Development of in-pixel, on focal plane signal processing for CCD arrays will continue.

**(U) Military Communications: (\$3.803 million)**

**(U)** Continue to investigate the technology of global high-rate military communications networking, including optical communications and tactical theater communications (particularly to forces on the move).

**(U) Combat Support Technology: (\$3.528 million)**

**(U)** Work will continue in the three core areas of Combat Support Technology. In the Combat Identification area advanced multi sensor fusion techniques will be implemented and tested in the AEGIS environment. The ultra violet bioagent sensor will be expanded by including a micro fluidic based bio-filter to address the bioagent identification problem. The fixed wing 6 inch micro air vehicle will be fabricated and tested and the effort will then be focused on a similar size hovering vehicle.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>	<b>DATE</b> February 1997
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**(U) Advanced Electronics Technology: (\$8.041 million)**

**(U)** Continue development of solid-state devices, materials and processing subsystems in support of DoD programs. Continue development of UV, visible, and IR 2-D and 3-D imaging devices with on focal plane processing. Continue development of advanced silicon digital and analog integrated circuits to support DoD system prototyping. Upgrade bio-detector prototype with discrimination and identification capability. Develop advanced mid-IR semiconductor lasers for IRCM. Demonstrate high performance real-time network monitoring and intrusion detection system. Demonstrate robust protocols for reliable distributed C4I system applications.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 2	R-1 ITEM NOMENCLATURE Lincoln Laboratory PE 0602234D		

<b>(U) B. <u>Program Change Summary</u></b>	<b><u>FY1996</u></b>	<b><u>FY1997</u></b>	<b><u>FY1998</u></b>	<b><u>FY1999</u></b>	<b><u>To Complete</u></b>	<b><u>Total Cost</u></b>
Previous President's Budget	12.393	20.068	20.546	21.250	Continuing	Continuing
Appropriated Value		20.068				
Adjustments to Appropriated Value						
a. Congressionally-directed undistributed reduction		(.514)				
b. Below-threshold reprogramming	1.337		(.072)	(.103)		
c. Other					Continuing	Continuing
Current President's Budget	13.730	19.554	20.474	21.147		
(U) Change Summary Explanation:						
(U) Funding: No changes.						
(U) Schedule: Not Applicable						
(U) Technical: Not Applicable						
(U) C. <u>Other Program Funding Summary Cost:</u>	Not applicable.					
(U) D. <u>Schedule Profile:</u>	Not Applicable					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2					R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Total Program Element (PE) Cost	7.150	7.985	8.987	9.810	9.976	10.106	10.321	10.565	Continuing	Continuing
Casualty Management P505	4.433	4.925	5.344	6.102	6.246	6.346	6.585	6.830	Continuing	Continuing
Molecular/Cellular Radiation Biology P511	2.717	3.060	3.643	3.708	3.730	3.760	3.736	3.735	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) This program is designed to improve understanding regarding acute and chronic exposure to ionizing radiation and to establish how modification of molecular/cellular mechanisms can mitigate the effects of radiation alone and radiation together with other hazardous agents that may be encountered on a battlefield. Current emphasis is on: (1) early effects from chronic and low doses of radiation associated with fallout fields, terrorist activities or radiation accidents, and (2) late effects, such as cancer.

(U) The Casualty Management project evaluates advanced medical management of irradiated personnel. This project also investigates interactions of ionizing radiation with biological warfare agents and chemical warfare agents. The Molecular/Cellular Radiation Biology project investigates new approaches to regulate biological processes to mitigate radiation and environmental toxicant damage such as cell killing, mutation and neoplastic transformation. This is a budget activity 2 program based upon the acquisition milestone process to which this research applies.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2		R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D								
COST ( <i>In Millions</i> )	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Casualty Management P505	4.433	4.925	5.344	6.102	6.246	6.346	6.585	6.830	Continuing	Continuing

(U) Project Number and Title: P505 Casualty Management

(U) The objectives are to provide advanced biomedical management of radiation or other toxicant injury to sensitive tissues, and to enhance the treatment/recovery of irradiated personnel; and to investigate the interactions of ionizing radiation with biological warfare (BW) and chemical warfare (CW) agents.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D	

(U) **FY 1996 Accomplishments:**

- (U) Began evaluation of new treatment protocols for low dose/low dose rate irradiation to hemopoietic system (\$.701 million).
- (U) Commenced evaluation of treatment related to route of infection in low dose/low dose rate irradiated animals (\$.701 million).
- (U) Demonstrated significant increase in susceptibility to lethal infection following radiation exposures at doses below operational exposure guidance limits (\$.428 million).
- (U) Determine that pyridostigmine, at protective levels used in the Gulf War, does not exacerbate radiation-induced motor performance decrement (\$.709 million).
- (U) Demonstrated synergistic interactions of ionizing radiation and mustard agents on DNA damage (\$.428 million).
- (U) Identified a promising combination of four drugs that protect against gamma radiation effects that compromise the integrity of the immunohematopoietic system and lead to mortality (\$.666 million).
- (U) Addressed health risks of embedded depleted uranium to developing fetus; found measurable uranium in the placenta and evidence of transfer to the fetus (\$.424 million).
- (U) Provided model of increased mortality resulting from radiation/BW interactions (\$.376 million).

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D	

(U) FY 1997 Plans:

- (U) Continue evaluation of new treatments for low dose/low dose rate radiation damage to hemopoietic system (\$.667 million).
- (U) Continue evaluation of treatment protocols for infection after low dose/low dose rate irradiation (\$.667 million).
- (U) Characterize interactions of radiation and BW agent simulants with hematopoietic, neuroendocrine, and gastrointestinal systems; and assess incapacitation for non-lethal exposures to radiation in combination with biological agents (\$.624 million).
- (U) Characterize pyridostigmine/radiation interactions on seizure activity. Initiate studies on nerve agent/radiation interactions on thermoregulation and performance (\$.667 million)
- (U) Continue investigation of mustard agent/radiation interactions on chromosomal damage and initiate studies on membrane damage (\$.570 million).
- (U) Continue assessment of drug protection factors with low dose rate gamma radiation exposure using early endpoints of lethality and task performance (\$.667 million).
- (U) Continue studies addressing health risks of embedded depleted uranium to the developing fetus; assess requirement for continued effort (\$.556 million).
- (U) Initiate animal studies to assess the efficacy of selected radioprotective agents for reduction of late radiation injuries, including cancer and tissue fibrosis (\$.507 million).

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D	

(U) **FY 1998 Plans:**

- (U) Provide assessment of a new treatment modality for low dose/low dose rate radiation damage to hemopoietic system; assess this treatment modality on infection following radiation exposure (\$.757 million).
- (U) Initiate studies on the impact of the route of infection on susceptibility to infection after irradiation at low dose rates (\$.703 million).
- (U) Continue to assess BW simulant/radiation interactions on hemopoietic, neuroendocrine, gastrointestinal systems and incapacitation end points. Improve initial models of resultant collateral damage in a nuclear/biological/chemical (NBC) environment (\$.678 million).
- (U) Characterize nerve agent/radiation interactions on seizure activity; thermoregulation and performance. Begin assessment of the efficacy of protective and therapeutic strategies (\$.928 million).
- (U) Continue investigation of mustard agent/radiation interactions on membrane damage. Initiate studies on cellular transformation (\$.549 million).
- (U) Initiate assessment of interactions of radiation exposure with immunization strategies for BW agents (\$.588 million).
- (U) Conduct initial assessment of drug protection factors with low dose rate gamma exposure using early endpoints of lethality and tasks performance (\$.588 million).
- (U) Continue long-term animal studies on cancer, immunologic dysfunction and tissue fibrosis (\$.553 million).

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D	

(U) **FY 1999 Plans:**

- (U) Assess combinations of novel therapeutic modalities with antibiotics and immunomodulators on infections following radiation exposure (\$.755 million).
- (U) Continue assessment of the impact of routes of infection and strain pathogenicity on susceptibility to infection after low dose/low dose rate radiation; begin to evaluate therapeutic agents (\$.768 million).
- (U) Quantitate lethality and incapacitation from combined exposure to BW simulants and radiation; improve predictive models of collateral damage in an NBC environment (\$.738 million).
- (U) Continue assessment of the efficacy of therapeutic and protective strategies on nerve agent/radiation interactions including effects on seizure activity, thermoregulation and performance (\$.759 million).
- (U) Define interactions of radiation and mustard agents on cell transformation and indicators of carcinogenesis (\$.653 million).
- (U) Continue assessment of interactions of radiation with immunization strategies for BW agents (\$.644 million).
- (U) Assess drug protection factors for protracted exposures in large animal models (\$.716 million).
- (U) Begin testing treatment strategies for embedded depleted uranium (\$.447 million).
- (U) Continue studies on late pathologic effects of radiation exposure and preventive strategies (\$.622 million).

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2					R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Molecular/Cellular Radiation Biology P511	2.717	3.060	3.643	3.708	3.730	3.760	3.736	3.735	Continuing	Continuing

(U) Project Number and Title: P511 Molecular and Cellular Radiation Biology

(U) The objective of the project is to investigate new approaches to regulate mammalian cellular and subcellular processes to mitigate damage from radiation and other environmental toxicants.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D	

## (U) FY 1996 Accomplishments:

- (U) Established primary cell cultures of the Harderian gland and evaluated methods of transfection and immortalization for subsequent assessment of radiation-induced carcinogenic risk and evaluation of protective drugs. (\$.577 million).
- (U) Initiated pilot study to evaluate the effects of embedded DU on cellular components of the immune system to determine if immunodeficiency is a consequence of exposure (\$.477 million).
- (U) Continued in vitro and in vivo DU carcinogenicity studies; observed oncogene expression and neoplastic cell transformations (\$.452 million).
- (U) Demonstrated feasibility of use of biodosimetric techniques (e.g., mitochondrial DNA deletion assay) for measurement of radiation injury at low dose exposures (\$.461 million).
- (U) Established dose-response relationships for novel alternative biodosimetric assays (e.g., the dicentric assay and the premature chromosome condensation (PCC) assay for fission neutrons) in an effort to develop a multi-faceted approach to assessment of radiation biodosimetry (\$.504 million).
- (U) Assessed the contribution of apoptotic cell death to the radiation-induced late effect of immune suppression (\$.246 million).

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D	

(U) **FY 1997 Plans:**

- (U) Correlate findings on risk of radiation-induced carcinogenesis in in vitro Harderian cell model with in vivo studies with neutron, gamma, and heavy ion radiation (\$\$.473 million).
- (U) Continue DU carcinogenicity studies to determine extent of oncogene and suppresser gene changes (\$\$.278 million).
- (U) Continue studies on DU induction of immunotoxicity (\$\$.463 million).
- (U) Continue work on development of alternative low-dose/low-rate biological dosimetry techniques to include cytogenetic (halo-comet) assays and mitochondrial deletion evaluation (\$\$.399 million).
- (U) Initiate biodosimetric studies using stable translocations as a novel approach (\$\$.375 million).
- (U) Begin assessment of interactions of chemical warfare agents with established biodosimetry techniques (\$\$.424 million).
- (U) Evaluate drug therapies to prevent radiation-induced programmed cell death (apoptosis) in immune cells and to enhance resistance of DNA to radiation damage (\$\$.424 million).
- (U) Assess the role of radiation-induced target cell responses in initiating late effect carcinogenesis and tissue fibrosis (\$\$.224 million).

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D	

(U) **FY 1998 Plans:**

- (U) Continue to assess radiation-induced carcinogenesis in vivo with neutron, gamma and heavy ion radiation based on in vitro Harderian cell model (\$.662 million).
- (U) Continue DU carcinogenicity studies; begin efforts to modify and reduce oncogene changes (\$.548 million).
- (U) Characterize interactions of mustard agents with radiation on chromosomal damage in human lymphocytes for assessment of interference with biodosimetric assays (\$.775 million).
- (U) Continue evaluation of drug protocols for efficacy in the prevention of radiation-induced apoptosis in immune cells in rodents (\$.588 million).
- (U) Continue development of alternative dosimetric assays (e.g., translocation assay) to provide multifaceted assessment of radiation exposure under a variety of scenarios (\$.752 million).
- (U) Continue assessment of the role of radiation-induced target cell responses in causing late effect carcinogenesis and tissue fibrosis, and initiate studies into preventive strategies (\$.318 million).

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D	

(U) FY 1999 Plans:

- (U) Evaluate new protective drug regimens to prevent radiation-induced carcinogenesis in the transfected Harderian cell model (\$.585 million).
- (U) Continue efforts to modify and reduce oncogene changes with DU; evaluate the necessity for risk analysis of biological toxicity of other heavy metal toxicants of military relevance (\$.628 million).
- (U) Complete assessment of combined effects of radiation and chemical warfare agent exposures using established biological dosimetry techniques (\$.767 million).
- (U) Complete evaluation of drug protocols for efficacy in the prevention of radiation-induced apoptosis in rodents and initiate studies in large animals (\$.574 million).
- (U) Continue development of alternative dosimetric assays (e.g., mitochondrial DNA deletion) to provide multifaceted assessment of radiation exposure under a variety of scenarios (\$.811 million).
- (U) Continue studies into preventive strategies for late-effect carcinogenesis and tissue fibrosis resulting from radiation-induced target cell responses (\$.343 million).



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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D	

(U) B. <u>Program Change Summary</u>	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>To Complete</u>	<u>Total Cost</u>
Previous President's Budget		8.196	9.019	9.858	Continuing	Continuing
Appropriated Value	7.204	8.196				
Adjustments to Appropriated Value:						
a. Congressional Undistributed reductions	(.054)	(.211)				
b. Below Thresholds			(.032)	(.048)		
c. Other Changes			8.987	9.810	Continuing	Continuing
Current President's Budget	7.150	7.985				

Change Summary Explanation:

Funding: Changes are due to Congressional adjustments.  
 Schedule: Not applicable  
 Technical: Not applicable

(U) C. Other Program Funding Summary Not applicable

(U) D. Schedule Profile Not applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3		R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. Medical Advanced Technology Program PE 0603002D								
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Total Program Element (PE) cost	3.899	3.276	2.778	2.191	2.262	2.324	2.373	2.428	Continuing	Continuing
Project A Name/No. and Subtotal Cost Risk Assessment and Biomedical Applications/P506	3.899	3.276	2.778	2.191	2.262	2.324	2.373	2.428	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

The medical advanced technology program is the sole in-house Department of Defense effort to: (1) develop new protocols for treating, reducing and predicting damage to hemopoietic and nervous systems from acute and chronic exposure to ionizing radiation, and (2) provide assessments of risk to personnel exposed to various doses, dose rates, and types of radiation and other toxicants. Efforts focus on cytogenetic assessments of risks and testing advanced medical management protocols for the sequelae associated with damage from radiation and/or other toxicants. These include the evaluation of new compound combinations for protection and treatment of injuries from low dose rates and/or multiple exposures, while remaining free of performance degradation. This is a budget activity level 3 program based upon the acquisition milestone process under which this research applies.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. Medical Advanced Technology Program PE 0603002D	

(U) Project Number and Title: P506 Risk Assessment and Biomedical Applications

(U) The objectives of this project are to establish biodosimetric techniques that will accurately assess the radiation dose, to apply advanced biomedical protocols for treatment of injuries to sensitive tissues, and to provide consultative efforts in support of DoD.

(U) FY 1996 Accomplishments:

- (U) Completed evaluation of new generation cell growth factors to enhance hematopoietic recovery from high dose gamma radiation (\$ .747 million).
- (U) Demonstrated feasibility for implementation of dosimetric techniques (e.g., Electron Paramagnetic Resonance); improved the analytical system for cytogenetic dosimetric approaches (e.g., chromosome aberration); demonstrated biodosimetric capability to DoD in an accidental exposure (\$1.129 million).
- (U) Provided scientific consultation in support of DoD's efforts in radiation/disaster management, Former Soviet Union scientific cooperation, etc. (\$ .497 million)
- (U) Studied potential interactions of ionizing radiation with exposure to chemical warfare (CW) and biological warfare (BW) agents. (\$ .759 million).

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. Medical Advanced Technology Program PE 0603002D	

- (U) Initiated studies to identify novel drug delivery systems to increase the duration of effectiveness of radioprotective drugs; established effort to assess a two drug combination pellet for transdermal implantation (\$.592 million).
- (U) Initiated biokinetic modeling of distribution and quantification of uranium from embedded depleted uranium (DU) fragments; provided data for modeling at the one day and one month time points (\$.175 million).
- (U) FY 1997 Plans:
- (U) Initiate the testing of cell growth factors to enhance resistance to infection and hemopoietic recovery from low dose/low dose rate radiation injury (\$.482 million).
- (U) Continue to validate alternative low-dose biodosimetry techniques; verify partial body dosimetry using clinical radiotherapy centers; provide biodosimetry assays in DoD applications for accidental radiation exposure patients (\$.862 million).
- (U) Continue automation of biodosimetric techniques (\$.292 million).
- (U) Continue consultative efforts in support of DoD's efforts in radiation/disaster management, Former Soviet Union scientific cooperation, etc. (\$.492 million).
- (U) Validate predictive models and continue studies of interactions of ionizing radiation with BW and CW agents. (\$.370 million).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. Medical Advanced Technology Program PE 0603002D	

- (U) Assess toxicity and tolerance of transdermal pellets prepared for drug delivery system of radioprotective agents; assess new radioprotective agents as they become available (\$.585 million).
- (U) Complete data collection (6, 12 and 18 month time points) for biokinetic modeling of uranium distribution from DU fragments (\$.193 million).
- (U) FY 1998 Plans:
- (U) Continue testing cell growth factors in novel delivery systems to enhance resistance to infection and hematopoietic recovery from low dose/low dose rate radiation injury (\$.379 million).
- (U) Expand cytogenic assay base for multi-assays strategy for dose assessment; continue to provide biodosimetry assays for DoD applications in accidental exposures (\$.488 million).
- (U) Continue development of "fieldable" biodosimetric techniques with efforts to provide automation of assays and implementation of laboratory approaches (\$.585 million).
- (U) Continue consultative efforts in support of DoD's efforts in radiation/disaster management, Former Soviet Union scientific cooperation, etc. (\$.498 million).
- (U) Continue efforts on predictive models and interactions between ionizing radiation and BW/CW agents (\$.110 million).

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. Medical Advanced Technology Program PE 0603002D	

- (U) Complete assessment of drug delivery system and evaluate its effectiveness in rodent models for protection from performance decrement associated with chronic radiation exposure; assess new radioprotective drugs as they become available (\$.538 million).
- (U) Complete biokinetic modeling of uranium distribution from DU fragments (\$.090 million).
- (U) Convene consensus conference to review treatment recommendations for DU injuries (\$.090 million).
- (U) FY 1999 Plans:
- (U) Complete testing of a cell growth factor in novel delivery system to enhance resistance to infection and hematopoietic recovery (\$.199 million).
- (U) Expand cytogenetic assay base for dose assessment of prior radiation exposure; continue to provide biodosimetry assays for DoD applications (\$.398 million).
- (U) Test "fieldable" biodosimetric techniques using blood samples from radiotherapy patients; assess interference by mustard agents on radiation dosimetric assay endpoints (\$.497 million).
- (U) Continue consultative efforts in support of DoD's efforts in radiation/disaster management, Former Soviet Union scientific cooperation, etc. (\$.449 million).
- (U) Provide initial casualty prediction model that addresses radiation-induced alterations in susceptibility to BW agents (\$.329 million).

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. Medical Advanced Technology Program PE 0603002D	

(U) Develop the identified drug delivery system (i.e. transdermal patch) for radioprotective drugs suitable for human use; continue to assess new radioprotective agents as they become available (\$319 million).

**(U) B. Program Change Summary**

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	Total <u>Cost</u>
Previous President's Budget	3.926	3.363	2.788	2.201	Continuing
Appropriated Value		3.363			
Adjustments to Appropriated Value					
a. Congressionally-directed undistributed reduction		(.087)			
b. Below-threshold reprogramming					
c. Other	(.027)		(.010)	(.010)	
Current Budget Submit/President's Budget	3.899	3.276	2.778	2.191	Continuing

Change Summary Explanation:

Funding: Changes are due to Defense Program adjustments  
 Schedule: Not Applicable  
 Technical: Not Applicable

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. Medical Advanced Technology Program PE 0603002D	

(U) C. Other Program Funding Summary Not Applicable.

(U) D. Schedule Profile Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3					R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology PE 0603104D					
COST ( <i>In Millions</i> )	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Total Program Element (PE) Cost	14.265	11.754	12.259	12.541	12.728	13.015	13.305	13.723	Continuing	Continuing
Project A Name/No. and Subtotal Cost JDTP/486	14.265	11.754	12.259	12.541	12.728	13.015	13.305	13.723	Continuing	Continuing

(U) **A. Mission Description and Budget Item Justification**

(U) The explosive demilitarization technology program is the sole Department of Defense effort focused on the development of safe, efficient, environmentally acceptable processes for the resource recovery and recycling (R3) or disposition of conventional munitions including explosives, and rocket motors. Currently, the DoD stockpile is nearly 500,000 tons with a forecast of 1,200,000 tons to flow through the stockpile by 2001. Efforts in this program emphasize environmentally compliant technologies to enhance existing methods of resource recovery and treatment such as open burning/open detonation. Existing methods are labor intensive therefore costly and expose personnel to explosive material. New technologies are required to address the rapidly growing national stockpile of conventional munitions, explosives and rocket motors requiring disposition. Technologies focus on new methods for disassembly; removal, reuse, and recovery of materials; and new methods of treatment. This is a Budget Activity 3 program because it supports the development and exploration of technologies designed to address the disposition of munitions preceding system engineering development.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology PE 0603104D	

(U) FY 1996 Accomplishments:

- (U) Developed an integrated system for removal and treatment of hazard class 1.1 propellant from tactical and strategic rocket motors. The system uses cryogenic dry washout and cryogenic fluids for removal and size reduction. Waste energetic materials are subject to base hydrolysis for desensitizing and hydrothermal treatment for complete environmentally benign destruction (\$2.2 Million).
- (U) Demonstrate critical fluid removal and recovery of hazard class 1.3/1.1 propellant (\$2.0 Million).
- (U) Initiated program to develop on-site portable monitor/sensors to determine propellant stabilizer content. Necessary for determination of safety in storage of existing propellant stockpile and those generated from resource recovery operations (\$1.0 Million).
- (U) Completed the first of eight scheduled tunnel demonstration at the Nevada Test Site. Included in this accomplishment is the development of advanced sampling and diagnostics, and Jointly integrate development processes to Demil execution projects (\$7.715 Million).
- (U) Initiated demonstration program to develop advanced cutting technologies for accessing/size reduction of encapsulated energetics. Technologies include cryogenic jet, water jet and laser (\$.4 Million).
- (U) Initiated program for development of advanced removal technologies for pressed-loaded explosives such as Explosive D (\$.950 Million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology PE 0603104D	

(U) FY 1997 Plans:

(U) FY1997 funding was assumed in the planning of the FY1998-03 program. Plans include, as directed by the Congress, additional tunnel demonstrations, cryogenic technology development, and critical fluid processing, propellant analysis and propellant reuse studies (\$ 11.754 Million).

(U) FY 1998 Plans:

(U) Projects and budget planned for FY1998-03 are aligned with the Department's FY1996 Demilitarization Technologies (Aug. 1996) report to the Congress and complies with Section 227, PL 104-201.

(U) Continue development and demonstration of technologies to reduce size prior to energetic material removal, incineration, and/or burning. Ongoing study to demonstrate cryojet cutting, advanced waterjet cutting, etc (\$ .250 Million).

(U) Initiate two-year program to develop an integrated system for removal and treatment of propellants from rocket motors. Programmed work includes cryogenic fluid (liquid nitrogen) washout. This work culminates research conducted under the Large Rocket Motor Demilitarization Program (\$ .900 Million).

(U) Commence three year program to develop transportable field units to reclaim contaminated rocket motor fluids (both contaminated fluids and liquid propellants) (\$ .500 Million).

(U) Complete technical assessment of previous projects for removal of conventional munitions and explosives. Previous programs included ultrasound removal, microwave removal, and supercritical fluids. The demonstrations will select one technology for follow on work in FY1999-2000 (\$ .250 Million).

(U) Complete a demonstration of a portable propellant/explosive analyzer for potential rapid prototype fielding. Technology needed to accurately assess existing aging stockpiles (\$ .700 Million).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology PE 0603 104D		

- (U) Develop a capability to process cyclotetramethylene (RDX/HMX) based high energy propellants, explosives, warhead, and other recovered energetics. Object of this program is to break down these materials, process the by-products, and reuse in a zero waste stream process. This project will conclude in FY1999 (\$ .800 Million).
- (U) Continue ongoing tunnel demonstrations at Nevada Test Sites. Includes initial construction and testing of a mobile contained burn facility to address the challenge of tactical missile demilitarization and replicatable detonation chambers, and Jointly integrate development processes to Demil execution projects (\$ 6.959 Million).
- (U) Initiate a three year effort to demonstrate catalytic hydrotreating as a viable environmentally safe method of destruction of munitions. Catalytic hydrotreating uses hydrogen based incineration as a replacement to oxygen based incineration, thereby decomposing into useful products (\$ .500 Million).
- (U) Commence a two year investigation of biodegradation of energetic materials. This technology will introduce microbes into a existing bioreactor to determine the useable by-products. A portion of the project will evaluate commercialization and carbon filter regeneration (\$ 1.400 Million).

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology PE 0603104D	

(U) FY 1999 Plans:

- (U) Continue development and demonstration of technologies to reduce size prior to energetic material removal, incineration, and/or burning. Ongoing study to demonstrate cryojet cutting, advanced waterjet cutting, etc. (\$.250 Million).
- (U) Complete rocket motor propellant removal and treatment project begun in FY98 (\$.700 Million).
- (U) Continue three year program begun in FY1998 to develop transportable field units to reclaim contaminated rocket motor fluids (both contaminated fluids and liquid propellants) (\$.850 Million).
- (U) Begin development of selected technology for removal of conventional munitions and explosives. Previous programs included ultrasound removal, microwave removal, and supercritical fluids (\$.400 Million).
- (U) Complete capability to process cyclotetramethylene (RDX/HMX) based high energy propellants, explosives, and warhead. Object of this program is to break down these materials, process the by-products, and reuse in a zero waste stream process (\$.250 Million).
- (U) Continue ongoing tunnel demonstrations at Nevada Test Sites. Includes feasibility determination of the reuse of energetics for the Taylor Pulse Fracturing technique. This technique would present another market for recovered explosives, and Jointly integrate development processes to Demil execution projects (\$ 6.991 Million).
- (U) Initiate a long-term, on-going project to develop/integrate sensors to certify existing stockpiled munitions are free of explosives. Current OSHA standards require that prior to removal, reuse, and recycling operations can begin on some explosives, they must be certified to be free of explosives. This project develops and improves sensors to streamline the certification process (\$.500 Million).
- (U) Complete the investigation of biodegradation of energetic materials. This technology will introduce microbes into an existing bioreactor to determine the useable by-products. A portion of the project will evaluate commercialization, and additional alternative treatment processes, super critical oxidation, hydrotreating, inductively coupled plasma will also be developed (\$2.600Million).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology PE 0603104D	

(U) B. Program Change Summary	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>To Complete</u>	<u>Total Cost</u>
FY 1997 President's Budget	15.000	0	0	0	Continuing	Continuing
Appropriated Value:		11.754				
Adjustments to Appropriated Value:						
a. Congressionally-directed undistributed reduction	(.735)					
b. Rescission/Below-threshold reprogramming:						
c. Other:			12.259	12.541		
Current Budget/FY-1998/99 President's Budget:	14.265	11.754	12.259	12.541	Continuing	Continuing

Change Summary Explanation:

Funding: FY 1996 and FY 1997 funding due to Congressional adds.

Schedule: Not Applicable

Technical: Not Applicable

(U) C. Other Program Funding Summary Not Applicable.

(U) D. Schedule Profile Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3					R-1 ITEM NOMENCLATURE Military HIV Research PE 0603105D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Total Program Element (PE) Cost	18.589	0	0	0	0	0	0	0	18.589	18.589
Project Name/No. and Subtotal Cost AIDS Research/105	18.589	0	0	0	0	0	0	0	18.589	18.589

(U) A. Mission Description and Budget Item Justification

- (U) **BRIEF DESCRIPTION OF ELEMENT:** Funding for this program element was added by Congress to the FY96 DoD budget request (Note: In other fiscal years, Congressional plus-up funds for HIV were provided in PE 0603105A). The program funds Acquired Immune Deficiency Syndrome (AIDS) research to control the infection in military environments, to protect the military blood supply and to protect military personnel from unusual risks associated with infection. This program is managed by the U.S. Army Medical Research and Materiel Command. The major contractor is Henry M. Jackson Foundation for the Advancement of Military Medicine, Rockville, MD. The program conducts proof of principle demonstrations and tests of non-system specific technologies to meet specific military needs, and is a Budget Activity 3 activity.
- (U) This project supports research by DoD military medical treatment facilities and medical research centers on Acquired Immune Deficiency Syndrome [AIDS] and human immunodeficiency virus [HIV] infection, treatment, and vaccine development.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Military HIV Research PE 0603105D	

(U) FY 1996 Accomplishments:

(U) Successfully completed a Phase I safety and immunogenicity trial of HIV Type B rgp120 vaccine in Thailand. The vaccine was safe and well tolerated with immunogenicity similar to that observed in U.S. trials. Demonstrated that Type E rgp120 vaccine is immunogenic in non-human primates. Completed preparation for a phase I/II dose evaluation trial with Type B and Type E rgp120. Designed study and obtained commitment from all parties to develop and proceed with a multi-arm prime boost efficacy trial in Thailand of several different vaccine products. (\$18.589 million)

(U) FY 1997 Plans:

(U) Not applicable.

(U) FY 1998 Plans:

(U) Not applicable.

(U) FY 1999 Plans:

(U) Not applicable.



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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Military HIV Research PE 0603105D	

(U) B. <u>Program Change Summary</u>	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>To Complete</u>	<u>Total Cost</u>
Previous President's Budget	3.926	3.363	2.788	2.201	Continuing	Continuing
Appropriated Value		3.363				
Adjustments to Appropriated Value:						
a. Congressional Undistributed Reductions		(.087)				
b. Below Thresholds						
c. Other Changes	(.027)		(.010)	(.010)		
Current President's Budget	3.899	3.276	2.788	2.191	Continuing	Continuing

(U) C. Other Program Funding Summary:

(U) Not Applicable.

(U) D. Schedule Profile:

(U) Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Military HIV Research PE 0603105D	

(U) B. <u>Program Change Summary</u>	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>To Complete</u>	<u>Total Cost</u>
Previous President's Budget	0				0	0
Appropriated Value	20.000				20.000	20.000
Adjustments to Appropriated Value:						
a. Congressional Undistributed Reductions						
b. Below Thresholds	(1.411)				(1.411)	(1.411)
c. Other Changes						
Current President's Budget	18.589				18.589	18.589

Change Summary Explanation:

Funding: Changes are due to minor program budget adjustments  
 Schedule: Not Applicable  
 Technical: Not Applicable

(U) C. Other Program Funding Summary:  
 (U) Not Applicable.

(U) D. Schedule Profile:  
 (U) Not Applicable.

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## RDT&amp;E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)

APPROPRIATION/BUDGET ACTIVITY:										DATE: February 1997	
RDT&E, Defense Wide / BA 3										R-1 ITEM NOMENCLATURE:	
										Demining PE 0603120D	
COST (In Millions \$)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost	
Total Program Element Cost Demining/ P547	0	14.369	7.663	7.592	6.585	5.594	5.713	5.848	Continuing	Continuing	

(U) A. Mission Descriptions and Budget Item Justification(U) BRIEF DESCRIPTION OF ELEMENTS:

(U) This program element develops technology and prototype equipment for humanitarian demining. Its objectives are to develop systems that locate mined/mine-free areas, detect and identify individual mines in varying terrain, clear mines in volume, and increase the safety of deminers. This program, which is under the direction of the Assistant Secretary of Defense, Special Operations and Low-Intensity Conflict, continues the initiatives started in FY1995 and FY1996, when \$10 million and \$3 million, respectively, were appropriated with Congressional add-ons in PE 0603606A. The program uses expertise from government, industry, academia, foreign countries, the United Nations, and non-government organizations to develop practical solutions for locating and clearing minefields and for detecting, marking and destroying landmines. The program focuses on developing equipment for the detection of metallic and non-metallic mines, low-cost mine neutralization, low-cost protective systems for personnel and clearance vehicles, and high-reliability clearance verification techniques and procedures. Near-term solutions are derived from technologies developed in military countermine programs, foreign development programs, and the application of technologies developed for other purposes. Technologies to be addressed in the longer term include advanced sensor technologies, such as ultra wide band radar, chemical sensing, and passive millimeter wave for mine detection and confirmation. Technology thrust areas will be coordinated closely with the Army Countermine Program, Unexploded Ordnance (UXO) Clearance Program, and other applicable programs to leverage technology and avoid duplication. Humanitarian demining needs and sustainment issues are identified and prioritized by the regional Commander-In-Chiefs, the Interagency Working Group and the Special Operations Forces. The Research and Development Subgroup of the Interagency Working Group on Demining coordinates research and development activities.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:(U) FY 1996 Accomplishments:

- (U) Developed and demonstrated commercial technologies for landmine detection and clearance. Completed development of multi-lingual mine awareness and training materials for instructing host nation deminers. Funds were in PE 0603606A, (Landmine Warfare and Barrier Advanced Technology).

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<b>RDT&amp;E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY:		R-1 ITEM NOMENCLATURE:
RDT&E, Defense Wide / BA 3		Demining PE 0603120D

(U) FY 1997 Plans:

(U) Start development, leveraging existing detection technologies for detecting on- and off-road anti-personnel and anti-tank mines using multiple sensors (handheld, vehicle-based, look-down) that incorporate sensor fusion capabilities combined with automatic target recognition (ATR) and Global Positioning Systems (GPS) target location features. Start development of remote-controlled equipment for locating and clearing landmines, which include integrated sensors and clearing equipment along lines of communication, and enhanced mechanical clearers specialized for demining agricultural areas. Start development of multi-media hardware and software optimized to provide multi-lingual mine awareness and training for host nation deminers. Start development of special purpose hand power tools optimized for demining. (\$14.369 Million)

(U) FY 1998 Plans:

(U) Continue development, leveraging existing detection technologies for detecting on- and off-road anti-personnel and anti-tank mines using multiple sensors (handheld, vehicle-based, look-down) that incorporate sensor fusion capabilities combined with ATR and GPS target location features. Continue development of remote-controlled equipment for locating and clearing landmines, which include integrated sensors and clearing equipment along lines of communication, and enhanced mechanical clearers specialized for demining agricultural areas. Continue development of multi-media hardware and software optimized to provide multi-lingual mine awareness and training for host nation deminers. Continue development of special purpose hand power tools optimized for demining. Start development of wide area clearance equipment. (\$7.663 Million)

(U) FY 1999 Plans:

(U) Complete development of handheld detection technologies for detecting on- and off-road anti-personnel and anti-tank mines using multiple sensor that incorporate sensor fusion capabilities combined with ATR and GPS target location features. Complete development of multi-media hardware and software optimized to provide multi-lingual mine awareness and training for host nation deminers. Complete development of wide area clearance equipment. Continue development of vehicle-based and look-down detection systems for detecting on- and off-road anti-personnel and anti-tank mines. Continue development of remote-controlled equipment for locating and clearing landmines, which include integrated sensors and clearing equipment along lines of communication, and enhanced mechanical clearers specialized for demining agricultural areas. Continue development of special purpose hand power tools optimized for demining. Start development of one or more chemical neutralization alternatives. (\$7.592 Million)

(U) ACQUISITION STRATEGY: Not Applicable

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# RDT&E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)

DATE:  
February 1997

APPROPRIATION/BUDGET ACTIVITY:

RDT&E, Defense Wide / BA 3

R-1 ITEM NOMENCLATURE:

Demining  
PE 0603120D

## (U) B. Program Change Summary

FY-1997 President's Budget:

Appropriated Value:

Adjustments to Appropriated Value:

a. Congressionally-directed undistributed reduction:

b. Rescission/Below-threshold reprogramming:

c. Other:

FY-1998/99 President's Budget:

Change Summary Explanation:

Funding:

Schedule:

Technical:

Changes due to minor program budget adjustments.

(total PE or Project, as applicable) Not Applicable

(total PE or Project, as applicable) Not Applicable

## (U) C. Other Program Funding Summary Cost:

\* \$3.0 million provided in PE 0603606A.

## (U) D. Schedule Profile: Not Applicable

	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>To Complete</u>	<u>Total Cost</u>
	0*	7.746	7.688	7.628	Continuing	Continuing
	0	14.746				
		(377)				
			(25)	(36)		
	0*	14.369	7.663	7.592	Continuing	Continuing

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## RDT&amp;E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)

APPROPRIATION/BUDGET ACTIVITY:										DATE: February 1997	
RDT&E, Defense Wide / BA 3										R-1 ITEM NOMENCLATURE:	
ALTERNATIVES TO ANTIPERSONNEL LANDMINES PE 0603121D											
COST (In Millions \$)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost	
Total Program Element Cost APL/P121	0	0	2.990	4.977	0	0	0	0	2.990	4.977	

(U) A. Mission Descriptions and Budget Item Justification(U) BRIEF DESCRIPTION OF ELEMENTS:

(U) P121, Alternatives to Antipersonnel Landmines (APL). This program element develops, tests, and evaluates area denial systems to replace anti-personnel landmines (APL). APL alternatives include, surveillance systems, command and control systems, and overwatch fires which will be evaluated and developed in parallel. Nonlethal technologies will also be evaluated for applicability. During the first phase, various concepts will be defined in detail and examined with emphasis placed on leveraging existing programs. A process to select viable alternatives for further evaluation will be conducted using modeling and simulation along with advanced warfighting experiments. Selected approaches will then enter a prototype development and evaluation phase.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:(U) FY 1996 Accomplishments:

(U) Not Applicable

(U) FY 1997 Plans:

(U) Not Applicable

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<b>RDT&amp;E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY:	R-1 ITEM NOMENCLATURE:	
RDT&E, Defense Wide / BA 3	ALTERNATIVES TO ANTIPERSONNEL LANDMINES PE 0603121D	

(U) **FY 1998 Plans:**

(U) The FY 1998 program will be finalized after the completion of an ongoing study effort and analysis of warfighting needs. The Landmine IPT is overseeing a FY 1997 study that is quantifying the military utility of APL, and assessing alternatives to APL, including force structure, tactics, techniques and procedures, and technology. Upon completion, this effort will identify candidates for development and advanced warfighting experiments to be performed with the FY 1998 funding. (\$2.990 Million)

(U) **FY 1999 Plans:**

(U) The FY 1999 program will be developed after the completion of the study cited in the FY 1998 paragraph, and the identification of the candidate developmental items/advanced warfighting experiments. (\$4.977 Million)



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<b>RDT&amp;E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY:	R-1 ITEM NOMENCLATURE:	
RDT&E, Defense Wide / BA 3	ALTERNATIVES TO ANTIPERSONNEL LANDMINES PE 0603121D	

(U) ACQUISITION STRATEGY: Not Applicable.(U) B. Program Change Summary

	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>To Complete</u>	<u>Total Cost</u>
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FY-1997 President's Budget:

0

0

0

0

Unknown

Appropriated Value:

0

0

0

0

Unknown

Adjustments to Appropriated Value:

a. Congressionally-directed undistributed reduction:

b. Rescission/Below-threshold reprogramming:

c. Other:

2.990

4.977

Unknown

Unknown

FY-1998/99 President's Budget:

0

0

2.990

4.977

Unknown

Unknown

Change Summary Explanation:

Funding: New start line item.

Schedule: (total PE or Project, as applicable)

Not Applicable

Technical:

(total PE or Project, as applicable)

Not Applicable

(U) C. Other Program Funding Summary Cost:

None

(U) D. Schedule Profile: Not Applicable

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RDT&E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)										DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY:					R-1 ITEM NOMENCLATURE:					
RDT&E, Defense Wide / BA 3					COUNTERTERROR TECHNICAL SUPPORT PE 0603122D					
COST (In Millions \$)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element Cost	16.656	21.098	34.863	37.057	40.613	42.986	44.563	40.277	Continuing	Continuing
P484, COUNTERTERROR TECHNICAL SUPPORT (CTTS)	16.656	16.455	29.087	31.554	34.990	37.238	38.690	34.275	Continuing	Continuing
P204, EXPLOSIVE ORDNANCE DISPOSAL / LOW INTENSITY CONFLICT (EOD / LIC)	*	3.287	4.165	4.121	4.210	4.303	4.397	4.493	Continuing	Continuing
P205, SPECIAL OPERATIONS / LOW INTENSITY CONFLICT (SO/LIC) ANALYTICAL SUPPORT	*	1.356	1.611	1.382	1.413	1.445	1.476	1.509	Continuing	Continuing

\* N.B.: Both projects, were funded in PE 1160402BB through FY 1996. These projects are now incorporated into the CTTS PE (#0603122D) as of FY 1997.

(U) A. Mission Descriptions and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENTS:

(U) P484, Counterterror Technical Support (CTTS). The Assistant Secretary of Defense for Special Operations and Low Intensity Conflict executes the CTTS Program through the Technical Support Working Group (TSWG). The CTTS Program, which includes both antiterrorism and counterterrorism projects, represents the integration of advanced development efforts to combat terrorism within Defense as well as among all agencies with requirements in combating terrorism. The CTTS program element supports development of technology and prototype equipment that has direct operational application in the national effort to counter terrorism. The program pursues many projects that address two programmatic objectives: (1) initial prototypes for evaluation within 12-24 months; and (2) longer time-frame technology development. Individual projects include technologies to support counterterrorism and anti-terrorism activities related to: hostage rescue; personnel protection; unconventional (chemical/biological) devices; attacks on installations, infrastructure, and the general populace; explosive detection and disposal; surveillance and terrorist threat assessment; and information processing and dissemination. This project supports, and is integrated into, the national interagency response to national terrorism. The program is highly leveraged on multiple agencies technologies and is not duplicated by other R&D efforts. This program supports measures against chemical and biological terrorism and is fully coordinated with the Chemical/Biological Defense Program and the Counterproliferation Support Program. CTTS focuses on future terrorist threats and interagency requirements to meet these threats. The TSWG is a multi-agency R&D working group under the aegis of the National Security Council's Interagency Working Group on Counterterrorism (IWG/CT). The TSWG identifies and prioritizes approved interagency requirements and needs. Current priorities are the detection and neutralization of terrorist-built explosive devices, countermeasures

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<b>RDT&amp;E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY:	R-1 ITEM NOMENCLATURE:	
RDT&E, Defense Wide / BA 3	COUNTERTERROR TECHNICAL SUPPORT PE 0603122D	

for chemical and biological terrorism, and the detection and surveillance of terrorists. In FY 1993, at the direction of Congress, the CTTS Program initiated efforts to conduct a cooperative international R&D program. Agreements with three countries have been signed, and projects are being executed with those countries.

(U) The CTTS program develops technologies and state-of-the-art prototype equipment that have direct operational application in the national effort to counter terrorism. Projects address the highest priority needs as dictated by current threat assessments. Documented activities and capabilities show that terrorists continue to be technologically and tactically sophisticated, which poses new challenges to our capability to respond.

(U) Projects are structured to address numerous technical focus areas. Capabilities to be pursued include: equipment used to prevent and respond effectively to a chemical/biological agent release in an urban area; building a national capability to detect and disable large-vehicle bombs; methods and systems used to detect portable improvised devices from stand-off distances; a national infrastructure assurance and protection; systems for improved audio and video surveillance of terrorists; devices used to locate and defeat intrusion detection sensors and security systems; effective detection and desensitization of ammonium nitrate-based explosives; more effective post-blast forensic analysis; and equipment and systems assisting DoD units and other lead response agency in dealing with consequence management following a terrorist attack. These areas address deficiencies cited in response to questions about the adequacy of counterterrorism R&D posed in Presidential Decision Directive 39 (PDD-39).

(U) All national and international projects are distributed among seven counterterrorism mission categories: Assault Support; Explosives Detection and Disposal; Weapons of Mass Destruction Countermeasures; Personnel Protection; Surveillance, Collections, and Operations Support; Physical Security and Infrastructure Protection; and Investigative Support and Forensics. This program is a non-system advanced technology development project used to demonstrate the utility or cost reduction potential of technology when applied to different types of defense equipment or techniques. It includes technology development and proof-of-principle demonstrations in field applications for new and improved systems. Coordination and planning efforts with the participating agencies facilitate technology transition from development to operational use. The demonstrations strive to evaluate integrated technologies in a realistic operating environment to assess the performance in actual mission scenarios and the cost reduction potential of advanced technology.

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**RDT&E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)**

DATE:  
February 1997

APPROPRIATION/BUDGET ACTIVITY:

RDT&E, Defense Wide / BA 3

R-1 ITEM NOMENCLATURE:

COUNTERTERROR TECHNICAL SUPPORT  
PE 0603122D

(U) P204, Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC). The EOD/LIC project is a rapid prototyping effort to provide technology and equipment to military operators who are confronted with explosive threats. Tasks focus on detection, countermeasures, and neutralization of explosive threats. Requirements submitted by the Joint Service EOD community and other LIC-oriented military users are prioritized by the OSD EOD/LIC Coordination Group.

(U) P205, Special Operations/Low-Intensity Conflict (SO/LIC) Analytical Support. The SO/LIC Analytical Support project provides specialized research and analytical support for the Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict, (ASD (SO/LIC)). Projects address a broad spectrum of technical, acquisition, and policy issues relating to special operations, counter- and anti-terrorism, peacekeeping, psychological operations, counterinsurgency, unconventional warfare, and contingency operations. The project supports and is integrated into overall DoD efforts to develop options for dealing effectively with a wide range of military responsibilities in military operations other than war. This project provides a vehicle to initiate analysis required to support acquisition documentation and conceptual policy issues regarding roles and missions of SOF in the changing world environment. Analysis may also be used to improve OASD(SO/LIC)'s congressionally mandated oversight function of special operations and low-intensity conflict.

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COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element Cost	16.656	21.098	34.863	37.057	40.613	42.986	44.563	40.277	Continuing	Continuing
<b>P484, COUNTERTERROR TECHNICAL SUPPORT (CTTS)</b>	16.656	16.455	29.087	31.544	34.990	37.238	38.690	34.275	Continuing	Continuing

**(U) PROGRAM ACCOMPLISHMENTS AND PLANS:**

**(U) FY 1996 Accomplishments:**

**(U) ASSAULT SUPPORT:** Continued the development of Specialized Access Tools. Started the development of a counterterrorism assault mobility platform. Started development of a rifle-fired 40mm grenade with a controlled fragmentation pattern for use in close quarters battle scenarios. Started the development of night vision goggles that mitigate the effects of "burn-out" and blooming when bright lights are encountered. (\$0.935 Million)

**(U) EXPLOSIVES DETECTION & DISPOSAL:** Completed the development of a prototype low-cost explosives detection system using nuclear quadrupole resonance technology suitable for fixed site inspections, portable applications, and personnel screening. Completed the development of a low-cost marking agent to be made available to domestic and international explosives manufacturers for the production of marked plastic explosives as well as other materials/propellants. Completed the development of a robot-based laser ranging and aiming system to permit operators to accurately aim and fire water disrupters from greater standoff distances. Completed the development of airborne synthetic aperture radar systems for detecting ground laid command wires which are used for detonating explosives. Completed the development of technology to detect improvised explosive devices through chemiluminescence and 3D x-ray machines. Completed the integration of the capability to detect both explosive vapors and particles into a single system. Continued the development of a large volume trace explosives detection system that can be used for screening luggage, vehicles, and cargo at various chokepoints or border crossings. Continued development of marking agent materials and processes specifically for identifying the presence of concealed detonation cord. Continued development of a system for the detection of terrorist bombs from standoff distances under certain conditions. Continued development of a system capable of identifying aircraft passengers whose hands have had contact with explosives. Continued to evaluate biosensor detection and canine olfactory technologies. Continued the development of a safe, non-flammable simulant for both x-ray and trace detection of datasheet. Started a project researching factors that affect the capabilities of improvised explosive device detection through biological schemes. Started development of a field-portable x-ray system for imaging the contents of suspect baggage/containers when access to only one side is possible. Started the development of a portable, suitcase-sized detection system with selectivity and sensitivity equal to or better than fixed systems. Started

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development of enhanced techniques for using Raman light spectroscopy for the detection, characterization, and identification of improvised explosive device residues. (\$2.160 Million)

(U) Started development of a relocatable Pulsed Fast Neutron Analysis (PFNA) Container Inspection System (CIS) designed to non-intrusively determine materials present in large shipping containers. The effort is part of the overall program to promote non-intrusive inspection technologies in the interdiction of illicit materials hidden in cargo containers, without interfering with legitimate trade and commerce. The capabilities of the PFNA technology provide the unique potential for a broad spectrum of automated inspection/detection operations, including the search for: explosives; chemical and biological agents; toxic materials; special nuclear materials; and other contraband items. (\$5.248 Million).

(U) **WEAPONS OF MASS DESTRUCTION COUNTERMEASURES:** Completed the test and evaluation of advanced mitigation techniques and systems for suppression and mitigation of explosively disseminated chemical/biological agents. Continued the development of the Biological Agent Test Kit. Continued the development of the real time, portable, hand-held biological agent detector. Continued the development of a non-toxic, non-corrosive, environmentally safe, foam-based system which uses catalytic enzymes for the decontamination of chemical/biological agents. Continued development of a low-cost, throw-away protective mask to provide sufficient levels of protection from a chemical/biological threat while egressing a contaminated area. Continued development of an analytical tool used to assist analysts and operations officers in identifying and assessing terrorism related events, personnel, activities, hardware, and transactions. Started development of a ruggedized and downsized capability for operators to determine the contents of closed containers. Started development of a blast protective suit with combined chemical and biological agent protection. Started the development of chemical agent decontaminates for use in foam matrices, as well as the development of better techniques for high-volume foam generation and use. Started the development of a biological molecule recognition sensing element based on the unique acoustic properties of biological agents using shear horizontal surface skimming bulk wave measuring techniques. Started the development of a standoff system for detection and characterization of chemical and biological agents using a non-nuclear source. Started the development of an improved, in-field capability to detect nuclear materials. Start the development of chemical/biological masks for first responders. (\$2.410 Million)

(U) **PERSONNEL PROTECTION:** Completed the development of lightweight, transparent armor that is capable of being fabricated into curved shapes. Continued the development of a project which aims to provide a fieldable prototype and data package for enhanced, lightweight roof and floor protection for armored passenger vehicles. Started development of flexible body armor that resists penetration and slashes from knives and other sharp edged instruments. (\$1.605 Million)

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<p align="center"><b>RDTE&amp;E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)</b></p>		<p>DATE: February 1997</p>
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<p>APPROPRIATION/BUDGET ACTIVITY:</p> <p>RDTE&amp;E, Defense Wide / BA 3</p>		

**(U) SURVEILLANCE, COLLECTIONS, & OPERATIONS SUPPORT:** Completed the development of a man-portable system for detection of underground caches of terrorist weapons. Completed development of a high-resolution, pinhole-compatible zoom video system for surveillance operations. Continued development of a specialized data relay system. Continued the development of a pattern recognition/neural network program to identify the terrorist groups most likely responsible for specific incidents. Started development of a passive system which employs encoded retro-reflectors for tracking objects in an urban environment. (\$1.340 Million)

**(U) PHYSICAL SECURITY & INFRASTRUCTURE PROTECTION:** Completed development of an intelligent radio repeater unit to support the complex communication requirements in a multi-user/agency scenario. Continued the development of an automated infrastructure analysis database. Continued development of a long-range, selectable effects weapon. Started development of a high quality, unmanned system to identify human targets for day and night operations at long ranges. Started the development of a system to nonintrusively analyze human vital signs in order to determine unusual degrees of agitation or anxiety. (\$1.515 Million)

**(U) INVESTIGATIVE SUPPORT & FORENSICS:** Completed the development of a rugged, hand-held, sensitive explosive and chemical agent sensor for post-incident field investigations. Completed development of a database to provide the ability to readily catalog the types of terrorist explosive devices. Continued the development of a method to improve the detection of TNT extracted from the debris of an explosion for detailed forensic analysis and identification. Continued effort to provide explosive standard reference materials that are certifiable and are acceptable for investigative and evidentiary purposes. Continued the development of improved methods for recovering latent fingerprints from problematic surfaces of terrorist-related items. Started the development of techniques to recover and analyze DNA found on material evidence. Started development of standard methods to identify post-blast explosive residue for use in forensics analysis to better prosecute terrorists. (\$1.443 Million)

**(U) FY 1997 Plans:**

**(U) ASSAULT SUPPORT:** Continues development of Specialized Access Tools. Continues development of a high-speed, personnel delivery boat. Continues development of a rifle-fired 40mm grenade with a controlled fragmentation pattern for use in close quarters battle scenarios. Continues development of night vision goggles that mitigate the effects of "burn-out" and blooming when bright lights are encountered. Starts development of an enhanced diversionary device. (\$1.250 Million)



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(U) **EXPLOSIVES DETECTION & DISPOSAL:** Completes development of a large volume trace explosives detection system that can be used for screening luggage, vehicles, and cargo at various chokepoints or border crossings. Completes development of marking agent materials and processes specifically for identifying the presence of concealed detonation cord. Completes development of enhanced techniques for using Raman light spectroscopy for the detection, characterization, and identification of improvised explosive device residues. Completes development of a series of biosensor detection and canine olfactory issues. Completes development of a system capable of identifying aircraft passengers whose hands have had contact with explosives. Completes development of a safe, non-flammable simulant for both x-ray and trace detection of datasheet. Continues development of a system for the detection of terrorist bombs from standoff distances under a variety of conditions. Continues development of a single-sided antenna for use with nuclear quadrupole resonance explosive detection methods. Continues researching factors that affect the capabilities of improvised explosive device detection through biological schemes. Continues development of a portable, suitcase-sized detection system with selectivity and sensitivity equal to or better than fixed systems. Continues development of a field-portable x-ray system for imaging the contents of suspect baggage/containers when access to only one side is possible. Starts development of the full spectrum of response requirements for large vehicle bombs, including detection, analysis, access, and disablement. Starts development of an interactive, computer-based improvised explosive device neutralization training system. Starts the development of a safer initiating system for various explosive disruption robots. Starts development of a single-sided antenna for use with nuclear quadrupole resonance explosive detection methods. (\$1.958 Million)

(U) Continues development of the Pulsed Fast Neutron Analysis (PFNA) Container Inspection System (CIS) to non-intrusively determine materials present in large shipping containers. (\$4.577 Million)

(U) **WEAPONS OF MASS DESTRUCTION COUNTERMEASURES:** Completes development of an analytical tool used to assist analysts and operations officers in identifying and assessing terrorism related events, personnel, activities, hardware, and transactions. Completes development of the Biological Agent Test Kit. Completes development of a non-toxic, non-corrosive, environmentally safe, foam-based system which uses catalytic enzymes for the decontamination of chemical/biological agents.

(U) Completes development of a blast protective suit with combined chemical and biological agent protection. Completes development of a biological molecule recognition sensing element based on the unique acoustic properties of biological agents using shear horizontal surface skimming bulk wave measuring techniques. Completes development of chemical agent decontaminates for use in foam matrices, as well as the development of better techniques for high-volume foam generation and use. Completes development of the real time, portable, handheld biological agent detector. Completes development of chemical/biological masks for first responders. Continues development of a standoff system for detection and characterization of chemical and biological agents using a non-nuclear source. Continues to develop a low-cost, throw-away protective mask to provide sufficient levels of protection from a chemical/biological threat while egressing a contaminated area. Continues development of a ruggedized and downsized capability for SOF to determine the contents of closed containers. Continues development of an improved, in-field capability to detect nuclear materials. Starts integration of a gas chromatograph with an existing, handheld chemical agent monitor to perform separation of contaminants to reduce false alarms. Starts development of a handheld reader for immunochromatographic assays for the detection of biological agents. (\$2.875 Million)

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- (U) **PERSONNEL PROTECTION:** Completes development of a fieldable prototype and data package for enhanced, lightweight roof and floor protection for armored passenger vehicles. Continues development of flexible body armor that resists penetration and slashes from knives and other sharp edged instruments. (\$1.100 Million)
- (U) **SURVEILLANCE, COLLECTIONS, & OPERATIONS SUPPORT:** Completes development of a specialized data relay system. Completes development a pattern recognition/neural network program to identify the terrorist groups most likely responsible for specific incidents. Completes development of a passive system which employs encoded retro-reflectors for tracking objects in an urban environment. Starts development of a microwave system for remote location of individuals with audio transmission capability. (\$1.370 Million)
- (U) **PHYSICAL SECURITY & INFRASTRUCTURE PROTECTION:** Completes development of a long-range, selectable effects weapon. Continues development of an automated infrastructure analysis database. Continues development of a high quality, unmanned system to identify human targets for day and night operations at long ranges. Continues development of a system to nonintrusively analyze human vital signs in order to determine unusual degrees of agitation or anxiety. Starts development of a rapid inspection system for the detection of bulk explosives at facility chokepoints. Starts the development of a non-intrusive, mobile inspection system of parked suspect vehicles. Starts the development of different detection systems and response plans to better meet the dynamics associated with a chemical agent release in non-battlefield scenarios. (\$1.600 Million)
- (U) **INVESTIGATIVE SUPPORT & FORENSICS:** Completes development of a method to improve the detection of TNT extracted from the debris of an explosion for detailed forensic analysis and identification. Completes effort to provide explosive standard reference materials that are certifiable and are acceptable for investigative and evidentiary purposes. Completes development of techniques to recover and analyze DNA found on material evidence. Completes development of improved methods for recovering latent fingerprints from problematic surfaces of terrorist-related items. Completes development of standard methods to identify post-blast explosive residue for use in forensics analysis to better prosecute terrorists. (\$1.725 Million)
- (U) **FY 1998 Plans:**
- (U) **ASSAULT SUPPORT:** Complete development of a high-speed, personnel delivery boat. Complete development of a rifle-fired 40mm grenade with a controlled fragmentation pattern for use in close quarters battle scenarios. Continue development of specialized access tools. Continue development of an enhanced diversionary device. Continue development of night vision goggles that mitigate the effects of "burn-out" and blooming when bright lights are encountered. (\$1.445 Million)

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(U) **EXPLOSIVES DETECTION & DISPOSAL:** Complete development of a field-portable x-ray system for imaging the contents of suspect baggage/containers when access to only one side is possible. Complete development of a portable, suitcase-sized detection system with selectivity and sensitivity equal to or better than fixed systems. Continue development of a system for the detection of terrorist bombs from standoff distances under a variety of conditions. Continue development of a single-sided antenna for use with nuclear quadrupole resonance explosive detection methods.

(U) Continue identifying factors that affect the capabilities of improvised explosive device detection through biological schemes. Continue to develop the full spectrum of response requirements for large vehicle bombs, including detection, analysis, access, and disablement. Continue to develop an interactive, computer-based improvised explosive device neutralization training system. Continue development of a safer initiating system for various explosive disruption robots. (\$6.036 Million)

(U) **WEAPONS OF MASS DESTRUCTION COUNTERMEASURES:** Complete the development of a standoff system for detection and characterization of chemical and biological agents using a non-nuclear source. Complete the development of a low-cost, throw-away protective mask to provide sufficient levels of protection from a chemical/biological threat while egressing a contaminated area. Complete the development of a ruggedized, downsized capability for operators to determine the contents of closed containers. Continue the integration of a gas chromatograph with an existing, handheld chemical agent monitor to perform separation of contaminants to reduce false alarms. Continue the development of an improved, in-field capability to identify nuclear materials. Continue to develop a handheld reader for immunochromatographic assays for the detection of biological agents. Start the development of a real-time, highly selective and sensitive, portable chemical warfare agent detection system based on time-of-flight mass spectrometry and high-speed gas chromatography. Start the development of a rapid detection system for pathogenic chemical and biological agents in food. (\$4.750 Million)

(U) **PERSONNEL PROTECTION:** Complete development of flexible body armor that resists penetration and slashes from knives and other sharp edged instruments. Start development of multilayered, lightweight, energy-absorbing, composite armor for vehicles. (\$0.650 Million)

(U) **SURVEILLANCE, COLLECTIONS, & OPERATIONS SUPPORT:** Complete development of a microwave system for remote location of individuals with audio transmission capability. Start development of small, lightweight, RF jammers. Start development of improved surveillance, tagging and tracking systems. \$2.630 Million)

(U) **PHYSICAL SECURITY & INFRASTRUCTURE PROTECTION:** Complete development of a high quality, unmanned system to identify human targets for day and night operations at long ranges. Complete development of a non-intrusive, mobile inspection system of parked suspect vehicles. Complete development of a system to nonintrusively analyze human vital signs in order to determine unusual degrees of agitation or anxiety. Continue development of an automated infrastructure analysis database. Continue development of a rapid inspection system for the detection of bulk explosives at facility chokepoints. Continue development of different detection systems and response plans to better meet the dynamics associated with a chemical agent release in non-battlefield scenarios. Start development of a means of modeling the effects of economic and information warfare terrorism. Start structural blast mitigation. (\$11.719 Million)

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**(U) INVESTIGATIVE SUPPORT & FORENSICS:** Start development of a chemical collector which uses a tandem array of specialized fibers. Start development of an information system to update the Explosives Encyclopedia and Distribution manuals on CD-ROM. Start development of an enhanced version of the CarBomb CAD analysis tool, which is a system that aides post-blast analysis of vehicle bombs. (\$1.857 Million)

**(U) FY 1999 Plans:**

**(U) ASSAULT SUPPORT:** Complete development of an enhanced diversionary device. Complete development of night vision goggles that mitigate the effects of "burn-out" and blooming when bright lights are encountered. Continue development of specialized access tools. Start development of a coherent fiber optic bundle for use with standard night vision goggles. (\$1.141 Million)

**(U) EXPLOSIVES DETECTION & DISPOSAL:** Complete development of a system for the detection of terrorist bombs from standoff distances under a variety of conditions. Complete development of an interactive, computer-based improvised explosive device neutralization training system. Complete development of a safer initiating system for various explosive disruption robots. Complete development of a single-sided antenna for use with nuclear quadrupole resonance explosive detection methods. Continue researching factors that affect the capabilities of improvised explosive device detection through biological schemes. Continue to develop the full spectrum of response requirements for large vehicle bombs, including detection, analysis, access, and disablement. Start development of a robotic system for the stand-off detection and identification of improvised explosive devices. Start development of a portable real-time backscatter x-ray system. Start the development of a single-sided neutron interrogation unit for the detection of vehicle bombs. Start development of equipment for the real-time detection of Ethylene Glycol Dinitrate. (\$5.700 Million)

**(U) WEAPONS OF MASS DESTRUCTION COUNTERMEASURES:** Complete integration of a gas chromatograph with an existing, handheld chemical agent monitor to perform separation of contaminants to reduce false alarms. Complete development of an improved, in-field capability to identify nuclear materials. Complete development of a real-time, highly selective and sensitive, portable chemical warfare agent detection system based on time-of-flight mass spectrometry and high-speed gas chromatography. Complete development of a smart optical chemical sensor. Complete development of a handheld reader for immunochromatographic assays for the detection of biological agents. Continue development of a rapid detection system for pathogenic chemical and biological agents in food. Start development of a miniature laser imager for gas plume visualization. Start development of a remote sensing and telemetering system for biological species. Start development of chemical agent suppression polymers. (\$5.025 Million)

**(U) PERSONNEL PROTECTION:** Complete development of multilayered, lightweight, energy-absorbing, composite armor for vehicles. Start development of a new fabric structure providing for greater ballistic protection. (\$0.650 Million)

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- (U) **SURVEILLANCE, COLLECTIONS, & OPERATIONS SUPPORT:** Complete development of a man-portable, passive millimeter wave camera. Continue development of small, lightweight, RF jammers. Continue development of improved surveillance, tagging and tracking systems. Start development of covert IR tagging and detection methods. Start development of a microminiature audio surveillance and camera system. (\$2.730 Million)
- (U) **PHYSICAL SECURITY & INFRASTRUCTURE PROTECTION:** Complete development of an automated infrastructure analysis database. Complete development of a polymer-based human presence detector. Continue development of a rapid inspection system for the detection of bulk explosives at facility chokepoints. Continue development of different detection systems and response plans to better meet the dynamics associated with a chemical agent release in non-battlefield scenarios. Continue development of modeling tools to model the effects of economic and information warfare terrorism. Continue structural blast mitigation. Start development of structural component testing for large blast effects damage. Start development of a system to provide an intelligent vulnerability, risk, and threat assessment tool to assist security professionals in making effective and cost-sensitive facility security decisions. Start development of a security infrastructure model that analyzes potential threats and response capabilities and processes. (\$14.864 Million)
- (U) **INVESTIGATIVE SUPPORT & FORENSICS:** Complete development of an information system used to update the Explosives Encyclopedia and Distribution manuals on CD-ROM. Complete development of an enhanced version of the CarBomb CAD design tool, which is a system that aides post-blast analysis of vehicle bombs. Continue development of a chemical collector which utilizes a tandem array of specialized fibers. Start development of chemicals to tag devices and documents with micro-tracer particles. (\$1.444 Million)

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COST (In Millions \$)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element Cost	*	21.098	34.863	37.057	40.613	42.986	44.563	40.277	Continuing	Continuing
P204, EXPLOSIVE ORDNANCE DISPOSAL / LOW INTENSITY CONFLICT (EOD / LIC)	*	3.287	4.165	4.121	4.210	4.303	4.397	4.493	Continuing	Continuing

\* N.B.: Project was funded in PE 1160402BB through FY 1996. Project is now incorporated into the CTTS PE (0603122D) as of FY 1997.

**(U) PROGRAM ACCOMPLISHMENTS AND PLANS:**

**FY 1996 Accomplishments:** Completed development of mini-flail, mine reconnaissance underwater vehicle, V2 computer enhancement, explosive kit ready storage, universal remote measuring device, light sensitive ordnance locator, shore signaling device, and underwater recoilless dearmers. (\$0.600 Million)

(U) Continued development of autonomous search vehicle, vehicle ballistic protection, imaging ordnance locator, and high-resolution diver sonar. (\$2.231 Million)

(U) Started development of standoff dearmers with laser sight to be used against improvised explosive devices (IEDs) and sensitively fused improved conventional munitions, non-explosive cartridge to replace the 0.50-caliber cartridge used in the Mk 2 dearmers with a safer and easier to transport non-explosive device, wearable 60-series computer to provide easy access to EOD 60-series publications downloaded from CD-ROM to PCMCIA cards for greater portability, and dry process x-ray to replace existing chemically processed x-ray film with film that can survive high shock loads and wide ranges of temperature and humidity. (\$1.250 Million)

(U) **FY 1997 Plans:** Complete development of autonomous search vehicle, vehicle ballistic protection, and a standoff dearmers with laser sight. (\$0.400 Million)

(U) Continue development of imaging ordnance locator, high-resolution diver sonar, non-explosive cartridge, wearable 60-series computer, and dry process x-ray film. (\$1.832 Million)

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(U) Start development of IED visualization methods to provide 3-dimensional x-ray views of an IED, remote field disassembly system to develop a portable remote hydro cutting capability with water recovery, and the limpet mine detection system to develop a handheld ultrasonic sonar capable of discriminating limpet mines from known hull features in low-visibility water. (\$1.055 Million)

(U) **FY 1998 Plans:** Complete development of imaging ordnance locator, high-resolution diver sonar, non-explosive cartridge, wearable 60-series computer, and dry process x-ray film. (\$0.500 Million)

(U) Continue development of IED visualization methods, remote field disassembly system, and limpet mine detection system. (\$1.000 Million)

(U) Start development of projects specifically requested by the Joint Service EOD Program, the United States Special Operations Command and other DoD components to improve the detection of explosives, the evaluation of explosive devices, the render safe procedures and associated data management systems related to unexploded ordnance and explosive devices. (\$2.665 Million)

(U) **FY 1999 Plans:** Complete the development of IED visualization methods, remote field disassembly system, and limpet mine detection system. (\$0.500 Million)

(U) Continue development of projects improving the detection of explosives through the range of EOD/LIC requirements, the evaluation of explosive devices and unexploded ordnance, the render safe procedures and the associated data management systems related to unexploded ordnance and explosive devices. (\$1.000 Million)

(U) Start development of projects improving the detection of explosives through the range of EOD/LIC requirements, the neutralization of unexploded ordnance, and the safety of countermeasures equipment. (\$2.621 Million)

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COST (In Millions \$)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element Cost	* .974	1.356	1.611	1.382	1.413	1.445	1.476	1.509	Continuing	Continuing
P205, SPECIAL OPERATIONS / LOW INTENSITY CONFLICT (SO/LIC) ANALYTICAL SUPPORT	* .974	1.356	1.611	1.382	1.413	1.445	1.476	1.509	Continuing	Continuing

\* N.B.: Project was funded in PE 1160402BB through FY 1996. Project is now incorporated into the CTTS PE (0603122D) as of FY 1997.

**(U) PROGRAM ACCOMPLISHMENTS AND PLANS:**

**(U) FY 1996 Accomplishments:** Projects include: Mission Applications of Non-Lethal Weapons, DoD World-Wide Antiterrorism Conference, SOF Cost Deployment Model, Case Studies in Special Operations for Professional Military Education Schools, International Terrorism Response Awareness Program V, Civil Affairs Challenges in the Interagency Environment, SOF Battle Lab, Role of DoD in Migrant Contingency Operations, and Rwanda: Civil-Military Interface in Humanitarian Emergencies. (\$0.974 Million)

**(U) FY 1997 Plans:** Projects include: Counterproliferation Capabilities Table Top Exercise, Strategic Psychological Operations, Counterterrorism, Future Operations and Support Costs of New Systems, AC-130 Force Structure Requirements, and Cyclone Class Patrol Craft Self-Defense. (\$1.356 Million)

**(U) FY 1998 Plans:** The FY 1998 program will be finalized in August 1997, ensuring that study projects are timely and responsive to the requirements of DoD policy makers. (\$1.611 Million)

**(U) FY 1999 Plans:** The FY 1999 program will be finalized in August 1998, ensuring that study projects are timely and responsive to the requirements of DoD policy makers. (\$1.382 Million)

**(U) ACQUISITION STRATEGY:** Not Applicable



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COUNTERTERROR TECHNICAL SUPPORT  
PE 0603122D(U) B. Program Change Summary

FY-1997 President's Budget:

Appropriated Value:

Adjustments to Appropriated Value:

a. Congressionally-directed undistributed reduction:

b. Rescission/Below-threshold reprogramming:

c. Other:

FY-1998/99 President's Budget:

	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY-1999</u>	<u>To Complete</u>	<u>Total Cost</u>
	12.044	16.521	17.979	18.031	Continuing	Continuing
	18.244	21.521			Continuing	Continuing
	(1.251)				Continuing	Continuing
	(.337)	(.423)	16.884	19.026	Continuing	Continuing
	16.656	21.098	34.863	37.057	Continuing	Continuing

Change Summary Explanation:

Funding:

FY96 resources for EOD/LIC and SO/LIC Analytical Support were in PE 1160402BB. The Defense Budget Review transferred those program resources into PE 0603122D. Congress added funds in FY 1996 and FY 1997 for Pulsed Fast Neutron Analysis (PFNA) Container Inspection System (CIS). Department of Defense provided additional funds during the FY 1998 budget review process.

Schedule:

(total PE or Project, as applicable) Not Applicable

Technical: (total PE or Project, as applicable) Not Applicable

(U) C. Other Program Funding Summary Cost:

Other Appropriation Funds: Department of State

(U) D. Schedule Profile: Not Applicable

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1997

BUDGET ACTIVITY

PE NUMBER AND TITLE

## 3 - Advanced Technology Development

0603160D Counterproliferation Advanced  
Technology Development

COST (In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	61680	57108	58264	57496	59328	64726	66109	67662	Continuing	Continuing
P535 Countering BW/CW	7722	7699	0	0	0	0	0	0	0	15421
P535 SOF Counterproliferation Support	0	0	11885	12847	14189	15832	16170	16549	Continuing	Continuing
P539 Counterforce	53958	49409	46379	44649	45139	48894	49939	51113	Continuing	Continuing

**Mission Description and Budget Item Justification:**

In August 1994, DoD established the Counterproliferation Support Program specifically to address the DoD shortfalls in counterproliferation operational capabilities documented in the May 1994 Report to Congress titled *Report on Nonproliferation and Counterproliferation Activities and Programs*. Counterproliferation Support Program funds are used to leverage DoD acquisition programs to meet the counterproliferation priorities of the Commanders-in-Chief (CINCs) of the Combatant Commands and accelerate the deployment of enhanced capabilities to the field. Specifically, the goal of the Counterproliferation Support Program is to improve specific military counterproliferation capabilities by (1) building on ongoing programs in the Services, DoD agencies, Department of Energy and US Intelligence; (2) focusing on the most critical counterproliferation shortfalls to address major gaps in deployed capabilities (as reflected in the CINCs' priorities and the Counterproliferation Review Committee's (CPRC) prioritized list of counterproliferation Areas for Capability Enhancements); (3) leveraging existing program funding to more rapidly field capabilities by accelerating the deliverables of DoD programs; (4) identifying and enhancing the development of high payoff technologies to accelerate capabilities to the warfighter; (5) identifying and promoting key non-materiel initiatives that complement technological advances; and (6) transitioning Counterproliferation Support Program projects to the Services as soon as practicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
3 - Advanced Technology Development		0603160D Counterproliferation Advanced Technology Development								P535	
COST (In Thousands)		FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
P535 Countering BW/CW		7722	7699	0	0	0	0	0	0	0	15421
<p><b>A. <u>Mission Description and Budget Item Justification</u></b></p> <p><b><u>Project P535 - Countering Biological Weapons (BW)/Chemical Weapons (CW)</u></b>: This project enhances US capabilities to prevent or mitigate biological and chemical threats/attacks. The project is divided into two categories: First Responder projects and Special Operations Forces (SOF) projects.</p> <p>The purpose of the First Responder projects is to quickly leverage DoD biological and chemical response, detection and mitigation technologies to crisis and consequence management response teams such as the US Army Technical Escort Unit (USA TEU), the Navy Defense Technical Response Group (DTRG), the Federal Emergency Management Agency (FEMA), the US Secret Service (USSS) and the Department of Public Health and Safety (PHS). These agencies have concepts of operation or employment doctrines considerably different from Major Regional Contingency based nuclear, biological and chemical (NBC) defense doctrine. These projects are executed in conjunction with the Joint Chiefs of Staff CONPLAN 0300, the Office of the Assistant Secretary of Defense (Special Operations and Low Intensity Conflicts) and the Technical Support Working Group of the National Security Council's Working Group on Counterterrorism to ensure full interagency coordination of requirements. Specific projects are detailed below.</p> <p><b>First Responder Projects:</b></p> <p>Perimeter Monitoring Sensor--A field portable sensor employing surface acoustic wave (SAW) and ion mobility spectroscopy that can be deployed in civilian settings or venues such as stadiums and parks. Potential users of this technology are the USA TEU, PHS, FEMA and FBI.</p> <p>Chemical and Biological Explosive Ordnance Disposal Suit--An Explosive Ordnance Disposal (EOD) blast suit that is configured for users that must disable chemical or biological explosive devices. Potential users of this technology are the US Army 52nd EOD unit and the USA TEU. This suit is being developed jointly with the Royal Canadian Mounted Police and the Defense Research Establishment, Suffield, England.</p> <p>Biological Detection Kit--Development of a first responder biological detection kit in conjunction with the US Army Medical Research Institute for Infectious Diseases and Navy Medical Research and Development Center. Typical users will be the USA TEU, FEMA, PHS, US Federal Drug Administration, USSS and the Central Intelligence Agency.</p> <p>Quick Mask--A joint Israeli/US project to develop a "quick mask" that has a long life, throw away capability and is easily deployable. The mask can be used by first responders and civilians in response to a chemical/biological threat environment for up to 30 minutes. Typical users will be the USSS and civilian first responders.</p>											

Project P535

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Exhibit R-2 (PE 0603160D)

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1997

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

## 3 - Advanced Technology Development

0603160D Counterproliferation Advanced

P535

## Technology Development

The SOF Projects will develop and demonstrate SOF unique devices that enable SOF and special mission units to detect, disable and neutralize Weapons of Mass Destruction (WMD) and their associated facilities under the direction of a geographic CINC in support of CONPLAN 0400. These techniques are leveraged from larger overall DoD programs. Specific projects are detailed below.

## SOF Projects:

Portable Devices for SOF Personnel--A classified project that enables SOF personnel to effectively accomplish their mission against WMD facilities.

Swept Frequency Acoustic Interferometer (SFAI)--A device to nonintrusively detect and identify the chemical contents of a container.

Chemical/Biological Weapon (CBW) Agent Extraction Tool--Samples a hazardous material, chemical agent or biological agent container with minimal signature and seals it upon exiting.

Special Operations Forces Fiber Optic Wave Guide (SOF-FOWG) Biosensor--An engineering adaptation of the FOWG to SOF small mission unit operational requirements. The SOF-FOWG device is designed to work in tandem with the drill extractor to sample biological agents.

Target Defeat--A classified project that will enable SOF personnel to complete specific targeting tasks against WMD threats.

SOF Chemical Agent Monitor (CAM)/Advanced Chemical Agent Detector/Alarm (ACADA)--Based on the Army's project to develop a mini gas-chromatograph, ion mobility mass spectrometer system. This device will be specialized for SOF unique environments and will serve as a hand held point and area monitor.

WMD Transport Container--Fabricate a WMD container system applicable to SOF transport aircraft. The container will support a jetison and recovery capability.

Acquisition Strategy:

## FY 1996 Accomplishments:

## • 1714 FIRST RESPONDER PROJECTS

• Perimeter Monitoring Sensor--selection of sensor suite platform; initiated development of communications links; integrated SAW and Ion Mass

• Spectrometer sensors; purchased data fusion and hazard prediction software (662)

• Chemical and Biological Explosive Ordnance Disposal Suit--procurement of initial prototype suits; initiated testing of suits; final design integration and delivery of suit to US Army TEU (229)

• Biological Detection Kit--completed market survey of potential candidate equipment; developed swab test kit; evaluated components; procured package and components (348)

• Quick Mask--performed front-end analysis of available off-the-shelf masks; conducted mask ergonomics and psychological studies (398)

• Counterterrorism Front End Analysis--initiated assessment of interagency counterterrorism requirements (77)

## 5513 SOF PROJECTS

• Development of portable devices for SOF--user down select of technologies; development of prototypes for field evaluation (2752)

• SFAI--completed chemical agent data base, precursor data base, industrial chemical data base and initial design of device; initiated fabrication (756)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1997
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Technology Development	0603160D Counterproliferation Advanced Technology Development	P535	
	<ul style="list-style-type: none"><li>SOF FOWG Biosensor--finalized design specification; initiated optics and fluidics subsystem development; initiated first prototype design (850)</li><li>CBW Agent Extraction Tool--completed initial prototype design; validated vacutainer reaction to chemical agents and precursors; constructed initial prototype and conducted field evaluations (155)</li><li>Target Defeat--developed overall design and teaming plan; initiated test bed evaluation; initiated computer simulations and testing (1000)</li><li>495 OTHER</li><li>Provided interim Joint Warning and Reporting Network (JWARN) for EUCOM Operation Joint Endeavor; integrated JWARN into Korea-based Airbase/Port Biological Detection Advanced Concept Technology Demonstration (495)</li></ul>		
Total	7722		
FY 1997 Planned Program:			
	1275 FIRST RESPONDER PROJECTS		
	Perimeter Monitoring Sensor--Initiate field test of sensor suite; ruggedize sensors; sensors-platform integration (500)		
	Biological Detection Kit--Fabricate prototype system; initiate sampling system development (500)		
	Quick Mask--Initiate user testing of mask; initiate certification (275)		
	6374 SOF PROJECTS		
	Development of portable devices for SOF--Field evaluation of prototypes; delivery of prototypes to user (1550)		
	SFAI--Complete and evaluate first fielded prototype; conduct user evaluation; conduct critical design review; initiate fabrication of final prototype (800)		
	SOF-FOWG Biosensor--Complete fabrication of first prototype; user test and evaluation; critical design review; initiate final fabrication of final prototype; acceptance and validation testing; delivery of initial units to user (250)		
	Target Defeat--Conduct initial testing to validate computer simulations; user test bed validation (1350)		
	CBW Agent Extraction Tool--develop, test and deliver 4 training prototype tools (80)		
	SOF CAM/ACADA--Finalize development specification; initiate prototype development; test and validation (300)		
	WMD Transport Container--Finalize design specification; initiate prototype fabrication (400)		
	Investigate advanced technologies for hard target defeat; initiate systems study for technology selections; preliminary device designs (1644)		
	50 Small Business Innovation Research Program		
Total	7699		
Project P535		Page 4 of 19 Pages	
		Exhibit R-2 (PE 0603160D)	

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Technology Development

0603160D Counterproliferation Advanced  
Technology Development

P535

Total 7699

**FY 1998 Planned Program:**

- 0 All activity under this project transferred to P535-SOF Counterproliferation Support beginning in FY 1998.

**FY 1999 Planned Program:**

- 0 All activity under this project transferred to P535-SOF Counterproliferation Support beginning in FY 1998.

**B. Project Change Summary**

	FY 1996	FY 1997	FY 1998	FY 1999	Total Cost
FY 1997 President's Budget	8774	8308	0	0	17082
Appropriated Value	8520	7699	N/A	N/A	N/A
Undistributed Congressional Adjustments	-798	0	N/A	N/A	N/A
FY 1998 President's Budget	7722	7699	0	0	15421

**C. Other Program Funding Summary**

Not applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1997
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
3 - Advanced Technology Development		0603160D Counterproliferation Advanced Technology Development								P535	
COST (In Thousands)		FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
P535	SOF Counterproliferation Support	0	0	11885	12847	14189	15832	16170	16549	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

**Project P535 - SOF Counterproliferation Support:** This project enhances US capabilities to prevent or mitigate biological and chemical threats/attacks. The project is divided into two categories: First Responder projects and Special Operations Forces (SOF) projects.

The purpose of the First Responder projects is to quickly leverage DoD biological and chemical response, detection and mitigation technologies to crisis and consequence management response teams such as the US Army Technical Escort Unit (USA TEU), the Navy Defense Technical Response Group (DTRG), the Federal Emergency Management Agency (FEMA), the US Secret Service (USSS) and the Department of Public Health and Safety (PHS). These agencies have concepts of operation or employment doctrines considerably different from Major Regional Contingency based nuclear, biological and chemical (NBC) defense doctrine. These projects are executed in conjunction with the Joint Chiefs of Staff CONPLAN 0300, the Office of the Assistant Secretary of Defense (Special Operations and Low Intensity Conflicts) and the Technical Support Working Group of the National Security Council's Working Group on Counterterrorism to ensure full interagency coordination of requirements. Specific projects are detailed below.

**First Responder Projects:**

**Perimeter Monitoring Sensor--**A field portable sensor employing surface acoustic wave (SAW) and ion mobility spectroscopy that can be deployed in civilian settings or venues such as stadiums and parks. Potential users of this technology are the PHS, FEMA and FBI.

**Biological Detection Kit--**Development of a first responder biological detection kit in conjunction with the US Army Medical Research Institute for Infectious Diseases and Navy Medical Research and Development Center. Typical users will be the USA TEU, FEMA, PHS, US Federal Drug Administration, USSS and the Central Intelligence Agency.

**Quick Mask--**A joint Israeli/US project to develop a "quick mask" that has a long life, throw away capability and is easily deployable. The mask can be used by first responders and civilians in response to a chemical/biological threat environment for up to 30 minutes. Typical users will be the USSS and civilian first responders.

**Handheld Gas Chromatograph Ion Mobility Spectroscopy Sensor--**Project to downsize the current Advanced Chemical Agent Detector/Alarm (ACADA) from a box unit to a hand held detector to give initial indicators or warnings of a chemical agent.



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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

## 3 - Advanced Technology Development

0603160D Counterproliferation Advanced  
Technology Development

P535

The SOF Projects will develop and demonstrate SOF unique devices that enable SOF and special mission units to detect, disable and neutralize Weapons of Mass Destruction (WMD) and their associated facilities under the direction of a geographic CINC in support of CONPLAN 0400. These techniques are leveraged from larger overall DoD programs. Specific projects are detailed below.

## SOF Projects:

Nuclear Search Tool Upgrades/Preplanned Product Improvement (P3I)—Upgrades and improvements to MK7S/LHT, gamma/neutron radiation detectors for area searches. Swept Frequency Acoustic Interferometer (SFAI)—A device to nonintrusively detect and identify the chemical contents of a container.

Special Operations Forces Fiber Optic Wave Guide (SOF-FOWG) Biosensor—An engineering adaptation of the FOWG to SOF small mission unit operational requirements. The SOF-FOWG device is designed to work in tandem with the drill extractor to sample biological agents.

Chemical/Biological Weapon (CBW) Agent Extraction Tool—Samples a hazardous material, chemical agent or biological agent container with minimal signature and seals it upon exiting.

Target Defeat—A classified project that will enable SOF personnel to complete specific targeting tasks against WMD threats.

SOF Chemical Agent Monitor (CAM)/Advanced Chemical Agent Detector/Alarm (ACADA)—Based on the Army's project to develop a mini gas-chromatograph, ion mobility mass spectrometer system. This device will be specialized for SOF unique environments and will serve as a hand held point and area monitor.

WMD Emergency Destruct Shape Charge—Development of a family of special purpose explosive shape charges to support emergency destruction.

WMD Transport Container—This project will enable SOF special mission units to fabricate a WMD container system applicable to SOF transport aircraft. The container will support a jettison and recovery capability.

WMD Lift/Transport Vehicle—Development of a multi-purpose, air transportable prototype vehicle capable of lifting and transporting recovered WMD into, around, and out of a WMD site.

Assault/Breach—Development of Special Access Program and specialized technologies to support obstacle penetration to allow movement of personnel and equipment through outer and inner barrier construction materials.

Assault/Mobility—Develop multi-purpose, air-transportable prototype vehicle capable of transporting equipment, casualties and personnel into underground facilities and out of WMD sites. Platform to support multi-tasked mechanical and special purpose breaching capabilities.

Acquisition Strategy:

## FY 1996 Accomplishments:

- 0 Merged project begins in FY 1998--formed from P535, PE 0603160D; P529, PE 0605160D; and P541, PE 0605160D

## FY 1997 Planned Program:

- 0 Merged project begins in FY 1998--formed from P535, PE 0603160D; P529, PE 0605160D; and P541, PE 0605160D

Project P535

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1997
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Technology Development	0603160D Counterproliferation Advanced Technology Development	P535	
FY 1998 Planned Program:			
• 1856	FIRST RESPONDER PROJECTS		
•	Perimeter Monitoring Sensor--Finalize field testing; deliver prototype unit to user (300)		
•	Biological Detection Kit--Field test system; deliver prototype units to user (238)		
•	Quick Mask--Initiate limited production of mask to user groups (162)		
•	Hand Held Gas Chromatograph Ion Mobility Spectroscopy Sensor--Initiate requirements collection and validation; fabricate breadboard system (500)		
•	WMD threat response operational plans and exercises--Validation and exercise cycles; readiness sustainment training for EOD WMD; shortfall assessments (656)		
• 10029	SOF PROJECTS		
•	SFAI--Complete final prototype; user field test and evaluation against live agents; delivery of initial prototypes to user (550)		
•	SOF-FOWG Biosensor--Correct any initial deficiencies of fielded prototype (100)		
•	SOF CAM/ACADA--Complete fabrication; conduct user test & evaluation; complete user training, acceptance testing and delivery of detectors (700)		
•	WMD Transport Container--Conduct test and evaluation; construct additional fabrication as required (1310)		
•	WMD Lift/Transport Vehicle--Develop multi-tasked, air-transportable prototype vehicle capable of transporting WMD weaponized systems or materials, downsizing large weapon systems and transporting recovered WMD (500)		
•	Target Defeat (Structural Defeat)--Development, evaluation and down-select of three classified projects to support specialized capabilities; weaponize down-selected technology (3494)		
•	Target Defeat (Functional Defeat)--Initial development of incendiary/energetic materials to support missions to render useless or destroy facility capability of specific target types (1000)		
•	Assault/Breach (Special Technologies)--Initial development of three classified projects to dramatically enhance SOF breaching capabilities to gain access into multiple configurations of specialized targets; validate technologies during series of field exercises (1300)		
•	Assault/Breach (Data Collection)--Telemetry and instrumentation support to five explosive access/breaching field exercises; collect data and perform analyses to support changes or modifications to explosive applications (650)		
•	Assault/Mobility--Conduct market survey to determine operational designs; refine functional requirements; purchase candidate prototype system based upon market survey; conduct early user test and evaluation; identify prototype improvements and modifications (425)		
Total	11885		

Project P535

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1997
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Technology Development	0603160D Counterproliferation Advanced Technology Development	P535	
FY 1999 Planned Program:			
• 1407	FIRST RESPONDER PROJECTS		
•	Detection capabilities for WMD (525)		
•	Mitigation capabilities for WMD (402)		
•	Neutralization capabilities for WMD (280)		
•	WMD threat response operational plans and exercises--Continue exercise cycles; assessments and equipment upgrades (200)		
• 11440	SOF PROJECTS		
•	Nuclear Search Tool Upgrades/P3I—Identify upgrade & improvements to MK7S/LHT, gamma/neutron radiation detectors for area searches; initiate upgrade for MK7S/LHT; improve detector efficiency; upgrade software and electronics package; reduce detector case size and weight; identify upgrade improvements to SIXPAC, a combined gamma-neutron radiation detector for area searches (300)		
•	CBW Agent Extraction Tool—User field training exercises and joint readiness exercises; correct any initial deficiencies of fielded prototype; fabricate SFAI interface with tool (200)		
•	SFAI—Correct any deficiencies of fielded prototype; update database and ordnance characterization (100)		
•	SOF-FOWG Biosensor—Update data bases (100)		
•	SOF CAM/ACADA—User FTX/JRX field evaluations; correct any deficiencies of first fielded prototypes; database update (100)		
•	WMD Emergency Destruct Shape Charge—Define data base requirements; establish shape charge performance requirements; conduct characterization of user "tool box" charges; initiate threat target modeling (300)		
•	WMD Lift/Transport Vehicle—Complete prototype fabrication; begin user field test and evaluation; identify system modifications; begin modifications based on user requirements (250)		
•	WMD Transport Container—Delivery of prototypes to user (850)		
•	Target Defeat (Structural Defeat)—Initial weaponization of selected technology; begin series of user field evaluations to validate operational and technical validation; begin modifications to test facility to support SOF Test Bed (4940)		
•	Target Defeat (Functional Defeat)—Begin weaponization of selected technology; initiate instrument test to validate weaponized system effectiveness through series of user exercises against functional targets; begin modifications as required to meet user requirements (1000)		
•	Assault/Breach (Special Technologies)—Advanced concept validation to prepare for ACTD; identify alternative technologies, as required, to enhance assault/breaching capabilities to meet requirements of unique target environments (1400)		
•	Assault/Breach (Data Collection)—Telemetry and instrumentation support to advanced concept validation for access/breaching field exercises; collect data and perform analyses to support changes or modifications to demonstrated technology applications (650)		

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Exhibit R-2 (PE 0603160D)

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PE NUMBER AND TITLE

**0603160D Counterproliferation Advanced**

PROJECT  
P535

- Assault/Mobility—Complete prototype improvements and modifications; conduct operational test and evaluation (250)
- Early Response Capability—Initiate technology development based upon FY 97-98 systems study and user requirements; validation of prototypes against user requirements (1000)

Total	12847
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Total CostFY 1999FY 1998FY 1997

FY 1996

**Not applicable.**

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Technology Development

0603160D Counterproliferation Advanced

P539

Technology Development

COST (In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
P539 Counterforce	53958	49409	46379	44649	45139	48894	49939	51113	Continuing	Continuing

A. Mission Description and Budget Item Justification

**Project P539 - Counterforce:** The purpose of this project is to develop technologies, demonstrate prototype systems and provide the warfighter with enhanced capabilities in response to current threat projections for potential adversaries who have the capability to develop and/or employ nuclear, biological and chemical (NBC) weapons in future regional conflicts involving the US or its allies. The US requires the capability to identify and characterize NBC research, production, storage and operational support facilities and be prepared to attack and neutralize them while minimizing the collateral effects resulting from the expulsion and release of NBC agents. The potential target set includes aboveground and underground hardened and unhardened facilities as well as tunneled facilities. The project started in FY95, and was structured to exploit ongoing technology programs wherever possible. Near-term emphasis is being applied to efforts to predict and measure the target response and the dispersion of agents associated with attacks against weapons of mass destruction (WMD) facilities using existing conventional weapons. In the mid-term, emphasis will be given to mitigating collateral effects through advanced weapon development and optimized weapon employment. The long-term focus will change to the demonstration of target planning tools, weapons and sensors that will support attacks on an expanded set of WMD targets that may include tunneled facilities. This project leverages ongoing DoD efforts to detect and track mobile targets. The milestones and products presented either accelerate existing milestones or expand upon the capabilities developed by those programs.

Previous descriptions of this project were divided into seven functional areas: sensors, collateral effects, agent neutralization, enhanced payloads, target response, weapons and the Counterproliferation Advanced Concept Technology Demonstration (CP ACTD). This description is reduced to five functional areas: sensors, collateral effects, target planning, weapons and the CP ACTD. The new functional structure recognizes the synergy between weapons, enhanced payloads and agent neutralization and reflects consolidated management.

This-project builds on previous Defense Special Weapons Agency (DSWA) projects to develop and mature sensor systems for treaty verification and underground facility characterization to provide additional capabilities for pre-, trans- and post-attack target characterization and damage and collateral effects assessments. The project further develops and accelerates capabilities in collateral effects prediction, target/weapon interaction prediction and funds the integration of these capabilities into service/CINC target planning systems. The project also builds on the Air Force programs in advanced weapon guidance, penetration and fuse enhancements. Air Force weapon development expertise will be used to integrate complementary, demonstrated technologies into prototype weapons that can improve prompt response, enhance lethality and control collateral effects. Advanced Concept Technology Demonstrations (ACTDs) will be used to expedite user access to advanced sensor systems and analysis methods, mission planning and collateral effects assessment tools and advanced payloads and penetrating weapons.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		<b>DATE</b> February 1997
<b>BUDGET ACTIVITY</b>	<b>PE NUMBER AND TITLE</b>	<b>PROJECT</b>
<b>3 - Advanced Technology Development</b>	<b>0603160D Counterproliferation Advanced Technology Development</b>	<b>P539</b>

**1. Sensors.** This effort will provide improved warfighting residual capabilities for facility characterization and battle damage assessment (BDA) against the spectrum of WMD facilities. Basic research and development are currently in progress at DSWA to characterize signatures from shallow underground facilities for exploitation by tactical unattended ground sensors (TUGS). Objectives of the current program include development of techniques for source identification, localization, and performing change detection in trans-attack signatures for weapon effectiveness analysis. Current intelligence community (IC) and Department of Energy (DOE) programs involve basic research and development to assess sensor performance and approaches for optimum sensor application for surface target detection and underground facility detection and characterization. This sub-project will leverage existing programs to (1) define concept of operations and sensor system (ground, air, and weapon based) architectures for BDA and facility characterization; (2) develop and demonstrate sensor technologies and prototype sensor systems for BDA and facility characterization; (3) produce data fusion and processing module for BDA and facility characterization to meet user requirements on existing platforms; (4) produce an integrated BDA module and supporting airborne and weapon-borne sensors; (5) develop and demonstrate a man-emplaced TUGS system which includes multi-sensor arrays and long-haul communications; (6) develop and demonstrate an advanced air-emplaced TUGS system for BDA and facility characterization; and (7) evaluate and demonstrate advanced sensor systems for UAV-based and ground-based remote identification of chemical and nuclear constituents expelled as a result of attacks on WMD facilities. Remote detection of biological agents is being addressed in other DoD projects and will be integrated into the counterforce demonstrations when sufficiently mature.

**2. Collateral Effects.** The Collateral Effects program provides predictive tools for NBC expulsion and dispersion resulting from attacks on WMD facilities as well as acts of terrorism and hostile use of WMD for a variety of applications supporting target attack planning and theater ballistic missile defense intercept or impact. Improvements include high resolution weather models and measurement systems. A key element in developing these collateral effects codes is chemical/biological expulsion tests and modeling needed to ensure early availability of predictive tools to support operational users. Funding will support teaming arrangements with DOE and ERDEC to provide improved expulsion source output data. Modeling of chemical/biological expulsion sources will be based on theoretical model and empirical data. Codes will be validated from existing data, other predictive models and special collateral effects experiments. The collateral effects tools will provide pre-attack prediction and post-attack assessment. These tools will also be integrated into the target attack planning tools to assess the consequences of attacks on WMD facilities.

**3. Target Planning.** This effort builds on DSWA core programs to develop lethality data, including tests, analysis and models, for CP specific targets across the spectrum of hardness. This includes 1) developing the lethality models for WMD specific targets, structures, systems, and components, including cumulative damage on WMD target lethality (both physical and functional), and 2) developing a model addressing weapon/target interaction as source functions for collateral effects. The Munitions Effects Assessment(MEA) targeting tool, developed by DSWA, will be expanded to address CP specific issues. The MEA will address other technologies such as the collateral effects, enhanced payloads, sensors and target signatures, as well as interface with Service mission planning tools such as the USAF Rapid Application of Air Power (RAAP) and CTAPS and the USN TAMPs. The culmination of all the test, data, analysis, and model development is to enhance the MEA to target WMD facilities including collateral effects predictions, enhanced payload lethality, sensors and BDA signatures. This area includes development of the Proliferation Path Assessment and Targeting System (PPATS) which assists in identifying critical steps in the proliferation process and aids in target identification/nomination.

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**4. Weapons.** Conventional explosive-filled penetrating weapons are often relatively ineffective in destroying large underground reinforced concrete facilities, even if the weapon detonates inside the facility, due to substantial interior walls and/or floors that confine the blast and fragmentation to a small area or result in complete and uncontrolled destruction of soft buried and aboveground facilities. When these facilities protect WMD, the random use of conventional weapons greatly increases the risk of NBC agent dispersal that may result in extensive civilian or friendly force casualties. This sub-project will develop, integrate and demonstrate advanced conventional weapons technologies that will improve mission effectiveness against WMD facilities while minimizing collateral effects. These technologies include improvements in adverse weather/precision guidance, enhanced penetrating capabilities, and agent defeat payloads that can reduce collateral effects by neutralizing agents before they are released. Technologies that have been successfully demonstrated will be weaponized into prototype systems. Agent neutralization will require key data needed to understand the collateral effects consequences of strikes against chemical and biological weapons-related facilities. The program also provides expeller agent viability experiments on bunker strike demonstration tests already planned under other programs. Advanced fuses will enable weapons employment options which maximize lethality and/or control collateral effects. Enhanced payloads will explore alternate warhead options to conventional blast/fragmentation with the objectives of minimizing collateral effects associated with dispersal of WMD materials while also minimizing the number of weapons required to functionally defeat WMD facilities. Functional defeat refers to eliminating a facility's capability to perform its intended function, even though the structure itself may remain largely intact. Capabilities established by this program directly support the development of payload upgrades.

**5. Counterproliferation (CP) Advanced Concept Technology Demonstration (ACTD).** The Counterproliferation ACTD will improve the operational capability for holding WMD targets at risk with controlled collateral effects. The objective is to integrate available or near-term technologies, evaluate the technologies in an operational context and transition improved capabilities rapidly to warfighters. The focus of ACTD efforts is to integrate demonstrated technologies for sensors, weapons, collateral effects and target planning tools into an end-to-end system and to conduct extensive system demonstrations in an operational context. Specifically, this project will enhance and accelerate existing programs to provide integrated target planning to include collateral effects prediction codes and sensors for facility identification, characterization and BDA, and advanced weapons development programs to meet WMD target defeat requirements. This counterproliferation program will also support demonstration operations to include system operational concept, demonstration planning, scenario development, execution of the ACTD and post-demonstration analysis. Planning and execution of the ACTDs use a time phased approach to screen candidate technologies for maturity, develop prototype systems and demonstrate enhancements in military capability against a warfighter prioritized subset of all potential WMD target types. This approach results in a cycle of prototype development and testing followed by periods of operational demonstration. Thus, the CP ACTD has been structured in phases.

Current planning covers several phases of the CP ACTD. The Phase I ACTD target is a bermed above ground simulated biological storage facility. The Phase II target is a cut-and-cover simulated chemical production facility. The focus for Phase III and follow-on phases includes adverse-weather precision weapon guidance and advanced sensors for target characterization and BDA and enhanced weapon payloads to minimize collateral effects.

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<u>Acquisition Strategy:</u>		
FY 1996 Accomplishments:		
• 22457 SENSORS	Developed design options and initiated proof of principle demonstration of the tactical FLIR pod modification (TFPM) for weapon thermal signature collection for application to battle damage assessment (BDA). (2180)	
•	Down-selected design approaches and conducted component level testing for the weapon borne sensor (WBS). (1825)	
•	Completed the hand-emplaced, tactical unattended ground sensor (TUGS) design and collected data from representative facilities during weapon detonations and facility equipment operation to demonstrate sensor utility. (3152)	
•	Defined user requirements and developed facility models for tactical multi-sensor data fusion (TMSF). (550)	
•	Began demonstration of WMD launcher detection using ATR on overhead assets. (5605)	
•	Expanded HAARP transmitter array to allow for future full scale experiments in finding underground targets. (5000)	
•	Initiated sub-scale experiments to investigate detection and imaging of underground facilities using the HAARP test facility. (4145)	
• 5187 COLLATERAL EFFECTS	Delivered initial chemical hazard module for targeting tool. (1100)	
•	Validated source models with large scale expulsion experiments. (1350)	
•	Continued development of Advanced Weather Support Unit. (1650)	
•	Extended atmosphere transport model across all platforms and tools. (1087)	
• 6050 TARGET PLANNING	Completed MEA Version 2.1, Windows versions and stand alone collateral effects capability, and initiated integration into the Rapid Application of Air Power (RAAP) targeting tool. (1493)	
•	Conducted WMD equipment vulnerability tests. Initiated development of component response models. (843)	
•	Developed lethality data for additional aboveground CP targets using JMEM methodologies. (646)	
•	Executed precision tests to validate lethality predictions and collateral effects source function generation. (1177)	
•	Performed analyses to identify warhead/equipment/structure interactions for Chem/Bio targets. (398)	
•	Procured critical equipment for large scale testing. (1493)	



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- 15100 WEAPONS
- Completed design and initial sled track testing of two options for the advanced unitary penetrator (AUP), fabricated sled and arena test articles and initiated risk reduction. (4634)
- Conducted lab and mid-scale tests to determine kill mechanisms for simulants and live agents and publish neutralization criteria. (3445)
- Selected carrier, completed software simulation and initiated hardware fabrication for ITAG guidance system. (3864)
- Conducted additional risk reduction testing of the Hard Target Smart Fuse (HTSF). (1649)
- Developed the HTSF ground setting unit (GSU). (500)
- Hard Target ATACMS—Established preliminary definition of payload to missile physical and functional interfaces; initiated trade studies on warhead internal layout and penetrator design. (1008)
- 4964 CP ACTD
- Defined ACTD Phase II demonstration scenarios, end-to-end system operational concepts and demonstration support requirements. (1500)
- Conducted Phase I operational demonstrations in simulated biological storage facilities; delivered initial versions of the target planning tools. (3464)
- 200 OTHER CP ACTIVITIES
- Completed FBI counter-terrorism study. (200)
- Total 53958
- FY 1997 Planned Program:**
- 16867 SENSORS:
- Complete proof of principle tests and feature extraction software for tactical FLIR pod modification. (1799)
- Integrate weapon borne sensor components and conduct system level tests. (2270)
- Complete development and testing of TUGS for CP ACTD Phase II and start monitoring the ACTD site. (3873)
- Complete system design and initial software release, and conduct initial operational testing of the tactical multi-sensor fusion capability. (750)
- Complete first phase of ATR demonstration. (1200)
- Expand HAARP transmitter array; conduct sub-scale experiments to investigate detection and imaging of underground facilities using the HAARP test facility (6975)
- 7190 COLLATERAL EFFECTS:
- Refine hazard source term models across all products including targeting tool. (1920)
- Initial Operational Capability for Advanced Weather Support Unit. (1800)

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<b>3 - Advanced Technology Development</b>	<b>0603160D Counterproliferation Advanced Technology Development</b>	<b>February 1997</b>	<b>P539</b>
<ul style="list-style-type: none"> <li>Integrate advanced meteorological and turbulent transport models into CE tools. (1970)</li> <li>Complete short and long range validation tests, and deliver final validation report for HASCAL version 3.0. (1500)</li> </ul>			
5122	<b>TARGET PLANNING</b>		
<ul style="list-style-type: none"> <li>Release MEA Version 2.2 - end-to-end capability to assess attacks on WMD aboveground production facilities using current and advanced weapons, exploit sensor data for pre-attack target characterization and post-attack BDA, RAAP integration. (2100)</li> <li>Complete component vulnerability models for Chem/Bio equipment. Implement the models in the MEA. (1400)</li> <li>Conduct 1/2 scale tests of CP ACTD Phase II structure and conduct 1/3 scale Dipole Tiger tests. (1622)</li> </ul>			
13019	<b>WEAPONS</b>		
<ul style="list-style-type: none"> <li>Complete penetrator tests. Package for ACTD. (4275)</li> <li>Continue integration and package ITAG guidance system for ACTD demonstration and complete trajectory simulation tests. (4001)</li> <li>Complete Hard Target Smart Fuse component improvement, validation testing and Joint Service certification. (1263)</li> <li>Conduct weapon certification support. (180)</li> <li>Hard Target ATACMS—complete System Requirements Review; establish warhead baseline concept; initiate design activities; complete missile/warhead interface design definition; conduct six degree of freedom simulations of missile/warhead flight; complete initial analysis of error contributors to system accuracy. (3300)</li> </ul>			
6488	<b>CP ACTD</b>		
<ul style="list-style-type: none"> <li>Complete Dipole Orbit and Dipole Tiger demonstrations. (1741)</li> <li>Complete demonstration planning for ACTD Phase II. (2351)</li> <li>Begin planning for the CP2 Counterforce ACTD. (2396)</li> </ul>			
723	<b>Small Business Innovation Research Program</b>		
Total	49409		
<b>FY 1998 Planned Program:</b>			
10050	<b>SENSORS</b>		
<ul style="list-style-type: none"> <li>Enhance BDA capability of the TFPM (1910)</li> <li>Design and fabricate prototype of an integrated WBS and Hard Target Smart Fuse. (1600)</li> <li>Complete design, and fabricate and test components for the air-delivered version of the TUGS. (2200)</li> <li>Integrate initial release of the TMSF onto existing user workstations and deliver the systems. (750)</li> </ul>			

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•	Identify mature remote detection systems technologies (e.g., chemical and weather) and communication pathways and incorporate these technologies into a TUGS. (1000)		
•	Develop TUGS detection, location and identification algorithms for CP2 ACTD target types. (1000)		
•	Identify and initiate integration of WMD target characterization and BDA sensors, to include stand-off collateral effects capabilities, into unmanned air vehicles (1590)		
•	8000 COLLATERAL EFFECTS		
•	Extend hazard source term models to CP2 ACTD target types. (2000)		
•	Expand HASCAL collateral effects predictions to support the CP2 ACTD target types. (1700)		
•	Conduct code validation experiments to support HASCAL development. (1800)		
•	Advanced Weather Support Unit FOC. (2000)		
•	Weather code validation. (500)		
•	6750 TARGET PLANNING		
•	Release MEA Version 3.0. (600)		
•	Complete Integrated MEA Version 3.0 integration and testing. (1375)		
•	Extend target response models to CP2 ACTD target types. (2800)		
•	Develop upgrades and enhanced user interfaces necessary for PPATS to achieve full operational capability. (1275)		
•	Initiate development of MEA 4.0. (700)		
•	11000 WEAPONS		
•	Complete kill mechanism characterization/sub-scale tests for agent defeat concept; begin weaponization studies. (3600)		
•	Complete ITAG fabrication/testing for ACTD. (2330)		
•	Evaluate competing adverse weather precision guidance systems for CP2 ACTD weapons feasibility. (1670)		
•	Evaluate advanced weapon/warhead concepts for CP lethality and target vulnerability. (3400)		
•	10579 CP ACTD		
•	Execute the CP ACTD Phase II. (4000)		
•	Conduct post-demonstration analysis. (2600)		
•	Conduct Phase II site refurbishment (800)		
•	Plan CP2 ACTD. (1000)		

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<hr/>			
<ul style="list-style-type: none"><li>Integrate and analyze the CP2 ACTD systems. (1000)</li><li>Design and initiate CP2 ACTD target development. (1179)</li></ul> <p>Total 46379</p>			
<b>FY 1999 Planned Program:</b>			
<ul style="list-style-type: none"><li>9800 SENSORS</li><li>Integrate components and conduct flight tests for the air-delivered version of the TUGS. (2500)</li><li>Complete TUGS algorithms for detection, location and identification of CP2 ACTD target types. (1600)</li><li>Complete integration of an unmanned air vehicle (UAV) payload for WMD target characterization and BDA. (3100)</li><li>Conduct initial operational testing of the TMSF version 3.0. (1600)</li><li>Assess availability of biological detection technologies to support BDA. (1000)</li></ul>			
<ul style="list-style-type: none"><li>7700 COLLATERAL EFFECTS</li><li>Complete HASCAL development for CP2 ACTD target types. (2300)</li><li>Extend hazard source term models to CP2 ACTD target types. (3600)</li><li>Upgrade hazard transport models for CP2 ACTD target types. (1800)</li></ul>			
<ul style="list-style-type: none"><li>6058 TARGET PLANNING</li><li>Extend target response models to CP2 ACTD target types. (1803)</li><li>Conduct 1/3 scale tests of CP2 ACTD structure. (1530)</li><li>Release upgrade of MEA to support the CP2 ACTD structure. (1025)</li><li>Conduct full-scale validation tests. (1700)</li></ul>			
<ul style="list-style-type: none"><li>13200 WEAPONS</li><li>Complete sled and full scale tests of small boosted penetrator. (3500)</li><li>Evaluate and flight test adverse weather guidance systems. (3200)</li><li>Continue validation testing of advanced weapons/warhead concepts against CP targets. (6500)</li></ul>			
<ul style="list-style-type: none"><li>7891 CP ACTD</li><li>Complete planning and target development for CP2 ACTD. (3000)</li></ul>			
<hr/>			
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- Complete planning and target development for CP2 ACTD. (3000)

- Continue post-demonstration analysis for CP2 ACTD. (2891)
- Plan follow-on CP ACTD phases. (2000)

Total 44649

B. Project Change Summary

FY 1997 President's Budget

Appropriated Value

Undistributed Congressional Adjustments

FY 1998 President's Budget

FY 1996	FY 1997	FY 1998	FY 1999	Total Cost
53979	48620	46533	44858	Continuing
56811	49409	N/A	N/A	N/A
-2853	0	N/A	N/A	N/A
53958	49409	46379	44649	Continuing

C. Other Program Funding Summary

	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
PE 0603122D, Counterterror	11408	16521	17982	18035	18446	18773	18773	18773	Cont	Cont
Technical Support										
PE 0602160D, Proj P533-CP Exploratory Development	13699	0	0	0	0	0	0	0	0	13699

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APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE					
RDT&E, Defense Wide/BA 3					JOINT DoD/DoE MUNITIONS PE 0603225D					
COST <i>(In Millions)</i>	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	20.675	17.743	16.141	16.354	16.880	17.353	17.724	18.140	Continuing	Continuing
Project Name/No. and Subtotal Cost DoD/DoE Munitions/P225	20.675	17.743	16.141	16.354	16.880	17.353	17.724	18.140	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) **BRIEF DESCRIPTION OF ELEMENT:** This R&D program is a cooperative, jointly funded effort between DoD and DoE to pursue new and innovative warhead, explosive, and fuse technologies in order to bring about major improvements in non-nuclear munitions. This program is in Budget Activity 3 because it supports the development and exploration of new munitions concepts and technology preceding system engineering development. Through our funding arrangement with DoE, DoD resources are matched. More importantly, this relatively small DoD contribution effectively taps the annual billion-dollar DoE RDT&E investment by accessing the specialized skills, scientific equipment, computational tools and knowledge base that the DoE maintains.

(U) The effort exploits the extensive and highly developed technology base resident in the National Laboratories relevant to achieving the goal of developing capable, cost-effective conventional munitions, and leverages DoD investments with matching DoE investments. The current program supports 52 projects in warhead technology, energetics, advanced initiation and fuze development, munitions demilitarization, service life technology, and computer simulation. Each of these active projects is sponsored by a specific Service laboratory. The program is administered and reviewed by a Joint Technical Advisory Committee composed of members from the Army, Navy, Air Force, OSD, and DoE. Projects are monitored semi-annually by DoD Service Laboratory/Technical Center personnel in order to insure that the technologies under development address priority DoD needs. The program is integrated with Service efforts through Project Reliance; the chairman and several members of the program Technical Advisory Committee serve on the Joint Directors of Laboratories' Technology Panel for Conventional Air/Surface Weaponry.

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**(U) PROGRAM ACCOMPLISHMENTS AND PLANS:**

**(U) FY 1996 Accomplishments:**

(U) This development effort has continued to improve electronic safing, arming, and firing technology, improving components, developing models, optimizing packaging and reducing production costs. Manufactured a small lot of sealed chip bridge detonators and tested aluminum-bridge composite-flyer chips. Observation and modeling of initiation inefficiency caused by flyer curvature of chip detonators was achieved. Designed and purchased chip bridges that are expected to launch flatter, more energy efficient (30%) flyers. Demonstrated multipoint systems with initiator energy reduced by 85%. This is the enabling technology for multimode and aimable warheads. Optimized 1 kV semiconductor bridge (SCB) slapper system and provided prototype SCB detonators and igniters to Army for evaluation and use in a smart mine demonstration in the Intelligent Minefield testbed. Dual dielectric capacitors were qualified for advanced initiation systems which reduce costs by 50%. Tested and characterized chip ceramic capacitors which will reduce size by 50%. Fast charge coupled devices (CCD) are being developed for very high-speed imaging (4000 frames/sec) in the visible and infrared. Design was completed for a high-speed image intensifier and high quantum efficiency GaAs intensifiers and fabrication is underway. Preliminary design of a high-speed camera is in progress, along with tests and models to support design and acquisition. (\$4.20 Millions)

(U) Developed and put into service a test facility for measuring high-rate deformation and temperature distributions of high explosives (HE). This facility uses the analytical tools of neutron resonance radiography, mechanical property measurements, and low-amplitude plate impact studies of various explosives components. Completed the study of vulnerability of liquid gun propellant and completed characterization of HE binder to support model development. New propellant and energetics chemical building blocks were developed for insensitive and no-residue products. Low- and high-rate heating experiments were performed to benchmark codes for cookoff and thermal aging prediction. The ALE3D code has been further improved, with emphasis on thermal safety calculations. The first-ever calculations of the Navy's variable confinement cookoff test (VCCT) test were within the experimental uncertainty in a blind (sealed envelope) comparison. The VCCT test is used to measure the cookoff response of a high explosive as a measure of fire safety. These experiments have never before been simulated numerically, and they increase our confidence that our safety calculations can be used to accelerate design processes. Three cast-cure high explosive formulations were developed as candidates for the Air Force's Miniaturized Munitions Technology Program. When compared to Tritonal, the current baseline high



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explosive, these formulations yield improvements ranging up to 150%, and are undergoing large scale arena testing. A new explosive formulation is being produced by Thiokol Corporation and has been given the designation LX-19. It has attracted worldwide attention, and it is likely that LX-19 will be the new explosive of choice for high performance metal acceleration applications, such as shaped charges. Completed transition of large-scale TNAZ production process to industry (90% reduction in pollution burden) and are refining further improvements to TNAZ process. Completed performance tests demonstrating detonator performance gain resulting from integration of high energy-density materials (HEDM). Performed slow heat, long-duration studies on broad spectrum of important energetics. Approaching completion of coupling Coyote-II to JAS and validate, thus providing multidimensional mechanical/thermal/chemical predictive capability. (\$4.0 Millions)

(U) Implemented production version of Smooth Particle Hydrodynamics (SPH) code achieving nearly 70x speedup over comparable Eulerian code, and transitioned code to five additional industrial users. Implemented common materials library for SPH and Eulerian codes, and validated the anisotropic plasticity model for tantalum in explosively-formed penetrator (EFP) applications. Completed 2D version of immersed boundary model for coupled fluid/structure modeling. Finalized the coupling between the optimization code and hydrocode, and generalized the interface for other hydrocodes. The CHEETAH code, which is the state of the art performance prediction code for high explosive formulations, has been extended to be applicable to gun and rocket propellant materials. CHEETAH users worldwide now number over 110. Conducted constitutive and failure modeling of shape charge liners of Ta-W alloys. Examined influence of trace impurities in performance of Cu liners. Began to optimize ability to conduct design studies of armor/antiarmor development using CTH running on a network of workstations, and improved ALEGRA shock physics code and its distribution. Developed velocity interferometry, radiographic, and photographic analysis of ceramic and ceramic composite materials for armor/antiarmor applications. (\$4.0 Millions)

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(U) Improved microstructure of tantalum has been achieved by powder metal forging techniques. This processing results in more uniform and predictable formation of explosively-formed projectile (EFP). Completed EFP tests to evaluate powder metallurgy tantalum vs. wrought tantalum and conducted tests of effects of specific textures on formation and performance. Transitioned anisotropic model to production codes and determined the influence of powder processes on texture evolution. Nonlinear optimization techniques have been extended for warhead design. Experimental studies were conducted to evaluate the temperatures and phase changes (melting) of metals in liner jet penetrators. Progress has been extensive in the application of high-resolution imaging to trumpet-shaped, tungsten-lined charges and more complex dynamic phenomena such as penetration and particulation. These experiments aid in exploring free-form, non-analytic warhead shapes using nuclear weapon design techniques to obtain a lower-velocity, slowly-stretching jet which is more effective at long standoff. Three types of time-resolved diagnostics are being developed to observe the passage of a jet or projectile through various target materials. An improved precursor charge for the JAVELIN warhead was designed and transitioned to production. The design is based on an innovative, free-form hemi concept. It is 30% lighter and 50% shorter than the most current technology. Smaller precursor charges are important because they reduce disruption to the main charge of the warhead and consequently improve the total warhead performance. Reactive munitions research determines the effect of munitions that couple energy to the target by rapid chemical reaction. Experiments have shown evidence of dynamic passivation which can inhibit reaction with the target. The data will be incorporated into the MESA-2D hydrocode to provide system design/assessment tools. (\$2.5 Millions)

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(U) The Molten Salt Destruction (MSD) process for hazardous organic wastes has now been demonstrated safe and environmentally acceptable for over 25 separate materials, including difficult DoD materials such as pyrotechnic smokes and dyes. Separate agreements were made with the Army and the Air Force to transition this technology to their facilities. The 60,000 pound-per-year MSD pilot plant has been completed and put into operation. This unit has been proven out for destruction of high explosive materials, and preparations for moving the unit to Wright Laboratories are underway. Studies leading toward permitted MSD operations in California and Florida have been initiated. The economic study was completed and pressurized reactor scale-up is in progress. Super Critical Water Oxidation (SWCO) demilitarization engineering was completed and an application has been expanded to an array of munitions waste materials. A pilot scale Base Hydrolysis (BH) reactor was built and tested. EPA acceptance of BH for production scale-up is underway. Enhanced and predictive surveillance techniques are proceeding to improve munitions shelf-life reliability predictions and to support munitions life extension programs. Life cycle studies have begun leveraging ongoing research at DOE in materials aging and degradation processes. This work is applicable to conventional munitions life extension and storage. Technical areas include corrosion, aging explosives, electronic failure or breakdown, contamination, etc., for use in predicting the performance, safety and reliability of munitions fuzes, warheads and propellants. (\$5.975 Millions)

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**(U)    FY 1997 Plans:**

- (U)    Continue improvement of electronic safing, arming, and firing systems toward smarter, less costly, and more compact units. Continue the transition of this technology to developmental and fielded weapons systems. Complete the design of high-speed camera system and complete procurement/testing of high-speed image intensifier at 532 nm. Evaluate performance of electron bombarded intensifiers. Begin development to make information processors integral with the warhead, allowing designers to fully capitalize on the emerging sensor packages, enabling a next generation of safer, more capable weapons. Develop 1 killovolt ceramic capacitor for fireset application. Demonstrate Electronic Safe/Arm/Fire Device (ESAD) size reduction of a factor of 4. Demonstrate producibility, packaging and long-term reliability of chip and semiconductor bridge (SCB) slappers. Test improved flyer shape detonators. Calibrate 2D hydrocode for finite shock initiation of explosives HNS and PETN. Continue research on integration of insensitive fuze trains with new insensitive high explosives to reduce overall weapons system vulnerability and for application to hard target penetrators. Demonstrate 20-point direct optical initiation in a 1 joule fieldable system. (\$4.2 Millions)
- (U)    Continue the development of high explosives (HE) with increased or tailored performance and decreased sensitivity. Establish basis for modeling which will support final choice of model structure. Continue development of a more energetic hard target explosive with improved survivability in penetration environments. Continue development of predictive tools for the response of energetics to abnormal environments. Acquire parameterized data set of strain fields in brittle and ductile HE to support modeling. Complete and transition to the Navy the initial code suite for use in multidimensional cookoff studies. Complete demonstration of high energy-density materials (HEDM) gains in small-scale applications. Demonstrate scale-up of improved TNAZ process, and produce energetic polymers for characterization tests. Test N<sub>2</sub> high energy density material for metastability at lower pressures and explore energy release mechanisms and kinetics. (\$3.6 Millions)
- (U)    Ongoing code development will be directed to the payoffs of greater accuracy, more physics base, extension to more classes of problems, and the associated improvement in cost effectiveness in R&D activities. Researchers will implement and test reactive- and dynamic-burn models with the Adaptive Mesh Refinement technique. Develop and extend material constitutive and failure models for incorporation into the simulation tools. Complete engineering models for high velocity penetration of concrete. (\$4.0 Millions)

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<p align="center"><b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b></p>		<p align="center">DATE February 1997</p>
<p>APPROPRIATION/BUDGET ACTIVITY RDT&amp;E, Defense Wide/BA 3</p>	<p align="center">R-1 ITEM NOMENCLATURE JOINT DoD/DoE MUNITIONS PE 0603225D</p>	

(U) Complete explosively-formed projectile (EFP) tests to evaluate powder metallurgy tantalum vs. wrought tantalum. Perform EFP tests to determine the effects of specific textures on formation and performance. Determine influence of powder processes on texture evolution. Precision measurement of shocked metal temperature will be made for model calibration. Improve Smooth Particle Hydrocode (SPH) user interface and data analysis packages, and expand the SPH materials library. Improve computational efficiency of extant plasticity and failure models. Acquire test data to validate fracture models. Transition coupled fluid/structure code to end users. An effort will be underway to evaluate EFPs in their ability to damage and perforate concrete. Tradeoffs between kinetic energy (KE) penetrators and EFPs with respect to velocity and mass, will be evaluated along with tandem EFP's and hybrid EFP/jets. To continue the dynamic analysis of liner formation and behavior, infrared thermometry using pulsed light will undergo reflector lab tests, and fluorescence techniques will be explored. (\$2.3 Millions)

(U) Complete a System Conceptual Design of hazard separation and treatment systems for broad demilitarization applicability. The concept will include a hardware design that is cost effective and can handle the recycle, treatment, and disposal of DoD weapon components. Process optimization studies will be completed on cryocycling as a method of extraction. The technology of demilitarization by supercritical water oxidation will be ready for transition for use in destruction of colored smoke, dye, and pyrotechnic compositions. Base hydrolysis will be advanced to the design stage of a pilot-scale pressure reactor, and economic and process design studies will be completed for a large-scale base hydrolysis/hydrothermal processing unit. Molten Salt Destruction efforts will focus on optimizing processes and certifying the equipment for increased production. Biological treatment of HE products in water waste streams will focus on designing a pilot plant for treating waste water contaminated with Comp B. This can result in recycle of carbon filter powder. Develop understanding and models of accelerated aging and damage of plastic bonded explosives. Explore non-destructive evaluation techniques for characterization of stockpile by acoustic and micro-electric current techniques. Determine mechanisms of aging of composite structures. Begin development of materials and systems aging predictive models and experiments based on aged stockpile sample evaluation. (\$3.543 Millions)

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<b>RD&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
<b>APPROPRIATION/BUDGET ACTIVITY RD&amp;E, Defense Wide/BA 3</b>	<b>R-1 ITEM NOMENCLATURE</b>	<b>JOINT DoD/DoE MUNITIONS PE 0603225D</b>

**(U)    FY 1998 Plans:**

(U)    Select successful technologies for electronic safing, arming, and firing systems which achieve smarter, less costly, and more compact units, and transition to developmental and fielded weapons systems. Continue development of fuzes which can put information processors integral with the warhead. Begin transition of demonstrated producibility, packaging and long-term reliability of chip and semiconductor bridge slappers. Focus research on integration of insensitive fuze trains with new insensitive high explosives to reduce overall weapons system vulnerability and for application to hard target penetrators. Explore transition of 20-point direct optical initiation in a 1J fieldable system. (\$4.2 Millions)

(U)    Transition applications for high explosives with increased or tailored performance and decreased sensitivity. Transition more energetic hard target explosive with improved survivability in penetration environments. Exploit predictive tools for the response of energetics to abnormal environments. Support the Navy in the transitioned code suite for use in multidimensional cookoff studies. Down-select from among carbon/hydrogen and its appropriate analogs and begin scaleup of high energy density energetics potentially based on non-equilibrium processing to increase energy storage in materials. Commence scale-up technique development for N<sub>2</sub> high energy density material and establish concepts of energy release mechanisms and kinetics. (\$3.7 Millions)

(U)    Code development will continue to attempt to achieve greater accuracy, more physics base, extension to more classes of problems, and the associated improvement in cost effectiveness in R&D activities. Expand the material constitutive and failure models for incorporation into the simulation tools, and develop a broader range of materials parameters. Begin transition of engineering models for high velocity penetration of concrete. (\$4.0 Millions)

(U)    Evaluate or downselect technologies of explosively-formed penetrators (EFP) based on their ability to damage and perforate concrete. Tradeoffs between kinetic energy (KE) penetrators and EFPs with respect to velocity and mass will be used to focus the effort, along with tandem EFP's and hybrid EFP/jets. Enhance the dynamic analysis of liner formation and behavior. Enhanced infrared thermometry using pulsed light based on reflector lab tests and fluorescence techniques will be evaluated. (\$2.241 Millions)

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		<b>DATE</b> February 1997
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense Wide/BA 3	<b>R-1 ITEM NOMENCLATURE</b> JOINT DoD/DoE MUNITIONS PE 0603225D	

(U) Transition the hazard separation and treatment systems for broad demilitarization applicability. Establish a hardware design that is cost effective and can handle the recycle, treatment, and disposal of DoD weapon components. Cryocycling as a method of extraction will be characterized and applicability determined. Begin transition of supercritical water oxidation as a demilitarization technique for use in destruction of colored smoke, dye, and pyrotechnic compositions. Complete design stage of base hydrolysis, and reach decision point for construction of a pilot-scale pressure reactor or a large-scale base hydrolysis/hydrothermal processing unit. Molten Salt Destruction process will be optimized and certified for increased production. Programs to understand mechanisms of damage, aging and consequence of stockpile materials and systems will continue to better predict service life and improve design. (\$2.0 Millions)

**UNCLASSIFIED**

<b>RD&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RD&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE JOINT DoD/DoE MUNITIONS PE 0603225D	

**(U) FY 1999 Plans:**

- (U) Innovate new technologies for electronic safing, arming, and firing systems based on evolving state-of-the-art science and technology. Driving need is toward smarter, less costly, and more compact units. Expand and enhance the transition of this technology to developmental and fielded weapons systems. Advance the application of miniature integrated fuzes, putting information processors integral with the warhead, allowing designers to fully capitalize on the emerging sensor packages, and enabling a next generation of safer, more capable weapons. Continue validation of performance and establish production of chip and semiconductor bridge slappers. Continue research on integration of insensitive fuze trains with new insensitive high explosives to reduce overall weapons system vulnerability and for application to hard target penetrators. (\$4.2 Millions)
- (U) Continue the development of high explosives with increased or tailored performance and decreased sensitivity. Develop a more energetic hard target explosive with improved survivability in penetration environments. Increase physics base of predictive tools for the response of energetics to abnormal environments. Advance computational tools to predict cookoff which are validated with experimental studies. Produce kilogram quantities of carbon/hydrogen or appropriate analogs and test for high energy density properties. Produce N2 high energy density material and continue testing of metastability at lower pressures and explore energy release mechanisms and kinetics. (\$3.6 Millions)
- (U) Ongoing code development will be directed to the payoffs of greater accuracy, more physics base, extension to more classes of problems, and the associated improvement in cost effectiveness in R&D activities. Suites of codes will be confined to predict slow and dynamic physical, chemical, and thermal reactions in explosives, with validity established by experiments. Validate models for high velocity penetration of concrete. (\$4.0 Millions)
- (U) Produce prototypes and begin pilot production of explosively-formed penetrators (EFP) based on their ability to damage and perforate concrete and other specified hard targets. Improve kinetic energy (KE) penetrators and EFPs, along with tandem EFP's and hybrid EFP/jets, and prototype advanced concepts. (\$2.3 Millions)



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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE JOINT DoD/DoE MUNITIONS PE 0603225D	

(U) Complete transition of the hazard separation and treatment systems for broad demilitarization applicability. Explore new hardware designs using newly-evolved technologies. Exploit new understanding and models of accelerated aging and damage of plastic bonded explosives. Establish library of non-destructive evaluation techniques for characterization of stockpile. Apply mechanisms of aging of composite structures to new designs and improved storage and handling. Continue development of materials and systems aging predictive models. (\$2.254 Millions)

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE JOINT DoD/DoE MUNITIONS PE 0603225D	

<u>(U) B. Program Change Summary</u>	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>To Complete</u>	<u>Total Cost</u>
Previous President's Budget	20.939	16.158	16.195	16.431	Continuing	Continuing
Appropriated Value	20.675	18.158	16.141	16.431		
Adjustments to Appropriated Value						
a. Congressionally-directed undistributed reduction		(.415)				
b. Rescission/Below-threshold reprogramming						
c. Other	(.264)		(.054)	(.077)		
Current Budget Submit/President's Budget	20.675	17.743	16.141	16.354	Continuing	Continuing
Change Summary Explanation:						
Funding:	Funding changes in FY 1996 are due to program budget adjustments. Changes to FY 1997 are due to Congressional Undistributed reductions.					
Schedule:	Not Applicable					
Technical:	Not Applicable					

(U) C. Other Program Funding Summary Cost Not Applicable

(U) D. Schedule Profile Not Applicable

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>										DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3		R-1 ITEM NOMENCLATURE Automatic Target Recognition PE 0603232D								
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	4.716	4.789	4.746	4.703	4.662	4.761	4.873	Continuing	Continuing
Project Name/No. and Sub-total Cost ATR/P232	0	4.716	4.789	4.746	4.703	4.662	4.761	4.873	Continuing	Continuing

**(U) A. Mission Description and Budget Item Justification**

**(U) BRIEF DESCRIPTION OF ELEMENT:** Automatic Target Recognition (ATR) systems improve the capabilities of our armed forces by enabling them to make better use of the information provided by military sensor systems such as radar, laser, infrared (IR), identification friend or foe (IFF), and electronic signal measurement (ESM). ATR enhances the combat capabilities of our forces by increasing the lethality of our weapons and reducing vulnerability of our weapons systems and decreasing the time required to identify potential adversaries. ATR technology reduces our risk of fratricide by improving our ability to distinguish between friend, foe, or neutral forces under high stress conditions. In an era of decreasing military manpower, improved ATR will enable our forces to handle an ever increasing load of sensory information in the complex situations to be encountered in the military missions of the future.

**(U)** Increasing ATR operational effectiveness requires research and development to enhance sensors and algorithm processing. Additionally, improved, standardized procedures and metrics for measuring and demonstrating ATR effectiveness must be developed. The utility of ATR is highly dependent on the quality of the information provided by the sensor system(s) and the ability to process that information effectively to provide reliable decisions with operationally acceptable false alarm rates. Service and Agency ATR efforts have concentrated on algorithm development for conducting post-processing comparison and decision making which exploit improved digital computational capability. This program will focus on determining effectiveness of ATR, establishing benchmark metrics, and conducting and collecting single and multi-sensor data for potential reuse in Service and Agency algorithm development. Consistent with the 1997 report of the Defense Science Board Task Force

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition PE 0603232D	

on ATR, this program will establish standard tests and procedures to provide an "honest broker" assessment of current leading candidate ATRs, as well as emerging ATR technology for the next generation of ATR systems.

(U) The ATR program is under Budget Activity 3 because this program funds the integration and demonstration of advanced technology for field experimentation and assessment. The result of the ATR program efforts is the integration of the demonstrated technological capabilities and the capability to assess algorithms and various technologies. This leads to greatly improved understanding of the Joint Warfighting utility when assessed in realistic operational contexts. Whereas the Military Services provide air, land, and naval technological superiority, respectively, and ACTDs rapidly prototype and transition technological solutions to specific threat scenarios, this program provides timely resources and flexibility to horizontally integrate technology solutions across Services and Agencies and identify new and emerging "best-in-class" ATR systems with confidence so that this critical technology can be fielded sooner.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition PE 0603232D	

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1996 Accomplishments:

Program begins in FY 1997

(U) FY 1997 Plans:

(U) In the first quarter, the Defense Science Board (DSB) Task Force (TF) on ATR reported a major recommendation that the Director for Defense Research and Engineering (DDR&E) should create an "honest broker" evaluation program to measure the performance and effectiveness of the best and emerging ATRs. It was concluded that standard data sets, procedures and metrics could produce greater confidence in DoD's acquisition decisions and hasten the fielding of this important technology. Concurrently, the Joint Requirements Oversight Council (JROC) of the Joint Chiefs of Staff, in response to a briefing by the DDR&E, provided a perspective on existing and emerging critical needs that depend on ATR. This response emphasized the need for confident image exploitation to speed up the process of getting sensor-derived information to the warfighter.

(U) Accordingly, the first year of this program will establish development methodologies to systematically evaluate ATR algorithms using standard data sets, procedures and metrics. Included in this effort is establishing a catalogue of standard, reusable data sets and developing measures of effectiveness for new, and existing program efforts (\$4.216 million).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition PE 0603232D	

(U) Additionally, emerging processing concepts, sensor modalities, multi-sensor concepts and other related technology which could significantly improve ATR performance will be assessed. Detailed investigations of the technologies will establish the capabilities of specific technology areas to improve ATR performance. Included in the focus technologies will be optical correlators, and multi-sensor fusion techniques. A major output of this effort will be to determine the most efficient means for collecting standard data sets for multiple sensors in following years (\$500M).

(U) FY 1998 Plans:

(U) Work will continue to assess key ATR to find the "best in class" and spur fielding for critical needs identified by the DSB and JROC. As a result of the FY97 effort, field experimentation to collect quality, reusable data using multiple sensors will be arranged. These data sets will then be available as benchmark sets to assess developmental algorithm validity and utility. Additionally, the program will begin to design the concepts for subsystem feasibility and effectiveness demonstrations of the more complex ideas discussed with the JROC, to include assessment of the role of ATR in reducing cognitive overload in man-machine systems. Subsystem modeling and simulation of sensor hardware with various ATR algorithms will be conducted to explore affordability and performance. A technology plan for transitioning the developed technology will be developed. (\$4.789 million)

(U) FY 1999 Plans:

(U) The evaluation effort for determining "best in class" will be expanded to include more complex ATR functions such as scene analysis, and new sensor types to include hyperspectral sensors. During this time period more extensive subsystem technology effectiveness demonstrations will be conducted which support a broader range of system/platform applications. More extensive multi-sensor algorithms will be evaluated. Modeling and simulation tasks will be conducted to provide software and hardware in the loop effectiveness analyses, refine design requirements and manufacturing approaches. These models and simulations will be used to expand the range of tests and provide greater confidence in ATR field tests, which by necessity are limited in scope and duration by the cost of testing the numerous factors that affect ATR and sensor performance. (\$4.746 million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE					
DEFENSE-WIDE RESEARCH, DEVELOPMENT TEST AND EVALUATION					SPECIAL TECHNOLOGY SUPPORT					
BA 3					PE 0603704D					
COST (In Millions)		FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete
Total Program Element (PE) Cost		16.895	17.252	11.750	11.896	12.278	12.621	12.890	13.193	Continuing
Project Name/No. and Subtotal		16.895	17.252	11.750	11.896	12.278	12.621	12.890	13.193	Continuing
Costs -										
Special Technology										
Support/P704										

**A. Mission Description and Budget Item Justification**

**BRIEF DESCRIPTION OF ELEMENT:** Special Technology Support to Intelligence and Light Forces provides quick reaction capability to satisfy CINC Intelligence and Light Forces requirements. It emphasizes the rapid prototyping of equipment and systems under initiatives which are ordinarily completed within a 12 to 24 month period, and cost less than a million dollars. By Congressional direction for FY 1990 and beyond, this program element contains two projects previously funded under other program elements: 1) the Counter Insurgency Special Technology Program (which was part of the Force Enhancements - Active Program / PE 110011D), and 2) a portion of the Equipment Upgrade Program / PE 0203745A). Both projects are intelligence related.

The PE is under Budget Activity 3, Advanced Development, since these initiatives result in proof of technological feasibility and technical and operational evaluations.

**PROGRAM ACCOMPLISHMENTS AND PLANS:**

FY 1996 Accomplishments:

- Continued the Advanced Secure Digital Radio - (\$2.0 Million)
- Developed route reconnaissance system for (\$0.16 Million)
- TROJAN SPIRIT Receive Element was field tested and transition of the system to the Army (\$0.312 Million)
- Made additional improvements to the theater Intell training and support element in USEUCOM (\$0.50 Million)
- Developed several compartmented intelligence collection capabilities (\$1.4 Million)
- Continued support to I-FOR: Provided technical improvements in Counter Intelligence and Force Protection Technology in the field (2.5 Million)
- Continued program TIGER WALL (\$8.5 Million)
- Provided surveillance equipment upgrades DHS and CI units (\$0.140 Million)
- Debriefers Aid was developed to assist agents in the field who are debriefing personnel (\$0.20 Million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY Research, Development, Test & Evaluation, Defense-wide/BA 3	R-1 ITEM NOMENCLATURE SPECIAL TECHNOLOGY SUPPORT PE 0603704D	

- Provided surveillance equipment upgrades DHS and CI units (\$0.140 Million)
- Debriefers Aid was developed to assist agents in the field who are debriefing personnel (\$0.20 Million)
- Jerboa Ring (\$0.755 Million)
- K9 detection of land mines and explosives: Provided a pilot program in force protection (\$0.093 Million)
- Developed a new hand held imagery solution for use on the USARMY TRIPP system and transition that to the Army (\$0.10 Million)
- Provided critical communications links in support of Technology insertions in support of Joint Endeavor (\$0.235 Million)

FY 1997 Plans: This program is a rapid prototyping effort to meet the immediate or emerging needs of the Intelligence and Light Forces communities in any given year. Nominations for projects are solicited each year and then prioritized for pursuit depending on tactical needs and funds available. The anticipated breakout of the thrust areas to be addressed and their estimated funding levels are as follows:

- Conclude the Advanced Secure Digital Radio - (\$2.2 Million)
- Special Project (\$2.5 Million)
- Interoperability and Crisis Support to Unified Commands (\$3.0 Million)
  - Sensors
  - CINCS Communications
  - Korean HUMINT Detachment Technology Insertions
  - Clandestine communication
  - Continued development and support to vehicle tracking and sensor system
  - Surveillance system

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE <b>February 1997</b>
APPROPRIATION/BUDGET ACTIVITY <b>Research, Development, Test &amp; Evaluation, Defense-wide/BA 3</b>	R-1 ITEM NOMENCLATURE <b>SPECIAL TECHNOLOGY SUPPORT PE 0603704D</b>	

- Develop new technology into the Counter Intelligence and HUMINT Community (\$3.0 Million)
  - New surveillance cameras
  - Offensive Counter Measures
  - Software encryption integration
  - Advanced Recon system closeout
  - Agent communications
- IR Suppressor for Counter Measures (\$0.400 Million)
- Data system security (\$0.364 Million)
- Conclude Tiger Wall - 1 Year R&D added (\$5.494 Million)
- Contribution to SBIR fund (.294 Million)

FY 1998 Plans

- Support to Technical Surveillance Activities (\$3.5 Million)
- Crisis support (\$2.05 Million)
- Develop several compartmented intelligence collection capabilities (\$2.4 Million)
- Continue Special Project (2.5 Million)
- Secure communications activities (\$1.3 Million)

FY 1999

- Support to Technical Surveillance Activities (\$3.5 Million)
- Crisis support (\$1.996 Million)
- Develop several compartmented intelligence collection capabilities (\$2.4 Million)
- Continue Special Project (2.5 Million)
- Secure communications activities (\$1.5 Million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE		
Research, Development, Test & Evaluation, Defense-wide/BA 3	SPECIAL TECHNOLOGY SUPPORT		
	PE 0603704D		

FY 1998-2003 PLANS:

**B. Program Change Summary**  
 Previous President's Budget (FY 1996)  
 Appropriated Value  
 Adjustments to Appropriated Value

FY1996	FY1997	FY1998	FY 1999	Total Cost
17.470	12.068	11.791	11.954	Continuing
17.470	12.068			

a. Congressionally-directed undistributed reduction (.594) (.310)

b. Below-threshold reprogramming

c. Prior-approval reprogramming

d. DoD Budget Adjustment .019 (.041) (.058)

e. FY 97 Congressional Budget Amendment for  
 Counterterrorism 5.494

Current Budget Submit/President's Budget 16.895 17.252 11.750 11.896

Change Summary Explanation:

Funding: Not Applicable  
 Schedule: Not Applicable  
 Technical: Not Applicable

**C. Other Program Funding Summary Cost** Not Applicable.

**D. Schedule Profile** Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE: FEBRUARY 1997
APPROPRIATION/BUDGET ACTIVITY: RDT&E, Defense-Wide/BA 3		R-1 ITEM NOMENCLATURE: STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM PE 0603716D								
COST ( <i>In Millions</i> )	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) cost	54.436	53.475	54.874	57.185	57.813	57.890	59.077	60.518	Continuing	Continuing
Project Name/No. and Subtotal Cost SERDP/P470	54.436	53.475	54.874	57.185	57.813	57.890	59.077	60.518	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) **BRIEF DESCRIPTION OF ELEMENT:** The Strategic Environmental Research and Development Program (SERDP) was established by Congress in 1990 (10 U.S.C. Section 2901-2904) to address Department of Defense (DoD) and Department of Energy (DOE) environmental concerns. It is conducted as a DoD program, jointly planned and executed by the DoD, DOE, and the Environmental Protection Agency (EPA), with strong participation by other Federal agencies, industry, and academia. SERDP's objective is to improve DoD mission readiness by providing new knowledge, cost effective technologies, and demonstrations in the areas of environmental cleanup, compliance, conservation, and pollution prevention to: (1) address high priority, mission- relevant, defense environmental technology needs necessary to enhance military operations, improve military systems' effectiveness, enhance military training/readiness, and help ensure the safety and welfare of military personnel and their dependents; and (2) enhance pollution prevention capabilities to reduce operational and life-cycle costs, as well as reducing the cost of necessary cleanup actions and compliance with laws and regulations. While addressing these highest priority, mission-related, defense environmental needs, SERDP, as a secondary benefit, helps solve significant national and international environmental problems. The keys to a growing list of SERDP technological successes are the ability to respond aggressively to these priority defense needs; the pursuit of universal, world-class technical excellence; emphasis on constant technology transfer to field use; and sound fiscal management. This is a budget activity level 3 program based on the acquisition milestone process under which this research applies.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: FEBRUARY 1997
APPROPRIATION/BUDGET ACTIVITY: RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE: STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM PE 0603716D	

**PROGRAM ACCOMPLISHMENTS AND PLANS:**

**(U) FY 1996 Accomplishments:**

**(U) DoD National Environmental Technology Test Sites Program:** Provides characterized test sites for comparative (proof-of-principle) demonstration and evaluation studies necessary to transfer innovative environmental site characterization technologies to field use. The program has five demonstration locations: the Port Hueneme Naval Facility, CA; Dover AFB, DE; McClellan AFB, CA; Wurtsmith AFB, MI; and Volunteer Army Ammunition Plant, TN. At Dover AFB, the Groundwater Remediation Field Laboratory was constructed as a unique facility in the U.S. to conduct controlled release experiments. The five test locations supported 30 full scale innovative site characterization and cleanup technology field demonstrations with 10 completed and 20 ongoing. The program produced a "Guidelines for Quality Technology Demonstrations" document which includes the requirements for QA/QC, test protocols, and reporting formats, in addition to providing a cost and performance database for completed proof-of-principle demonstrations, and technology transfer and marketing strategies. (\$3.524 Million)

**(U) Clean, Agile Manufacturing of Energetics:** Develops new Propellant, Explosive, and Pyrotechnic (PEP) materials, processes, and concepts for the purpose of reconfiguring existing PEP facilities to reduce hazardous waste by 90 percent. The program has demonstrated the manufacture of Melt Castable Explosive without volatile organic compound (VOC) solvents in a 50 Kg Pilot Plant; demonstrated the manufacture of Thermal Plastic Elastomers (TPE) without VOC solvents at a pilot plant; determined process parameters for the manufacture of RDX based explosive using a TPE binder; developed a process control method for twin-screw mixing of TPE binder into a PEP formulation; and verified and validated manufacturing models for PEP. (\$2.5 Million)

**(U) Whale Monitoring Using Integrated Undersea Surveillance Systems (IUSS):** In response to the Navy's highest priority mission-related need, initiated a major experimental effort to identify specific species of whales and their movement in the Atlantic and Pacific Ocean. This will allow determination of exclusion zones to facilitate fleet training operations and preclude incidental taking of whales by Navy ships. Data interfaces between the IUSS and potential users have been markedly improved; conducted a joint groundtruth test cruise with National Oceanic and Atmospheric Administration (NOAA); and completed a report on population estimation using automated long-term statistical monitoring. (\$2.4 Million)

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: FEBRUARY 1997
APPROPRIATION/BUDGET ACTIVITY: RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE: STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM PE 0603716D	

- (U) **Accelerated Tri-Services Site Characterization and Analysis Penetrometer System Sensor Development (SCAPS):** Combines traditional cone penetrometer technology with advanced sensors to provide a profile of DoD contaminants and geophysical properties in a rapid and cost-effective manner. The program has developed Fiber Optic Raman Sensor/software for detecting Dense Non-Aqueous Phase Liquids (DNAPLs) in soils and groundwater; developed and fielded a Laser-Induced Breakdown Spectroscopy sensor for metals; demonstrated improved electrochemical sensor systems for explosives; developed an enhanced microchip laser sensor for petroleum, oils, and lubricants (POL); and conducted field tests and demonstrations of the thermal desorption Volatile Organic Compounds (VOC) sampler. (\$2.164 Million)
- (U) **Characterize Open Burning/Open Detonation (OB/OD) Emissions:** Develops protocol and technology to assess emissions from open burning/open detonation of surplus energetics. This project has initiated experimental testing in an enhanced BangBox testing chamber; characterized propellants, explosives, and pyrotechnics; released guidance on using risk factors for OB/OD permit applications; and optimized combustion and grouped munitions by emissions families. Emission data will provide the basis for permitting operational OB/OD sites. Field testing will determine the actual emissions produced by OB/OD disposal methods. Full acceptance of test results will allow the Defense Department to save millions of dollars by resuming OB/OD disposal of certain obsolete munitions and propellants. (\$1.505 Million)
- (U) **Unexploded Ordnance (UXO) Detection:** This umbrella project focuses on the DoD's highest cleanup priority requirement and consisted of two major efforts in FY96. (\$1.03 Million)
- Mobile Underwater Debris Survey System (MUDSS):** Continuing project which, when complete, will integrate and demonstrate multi-sensor and processing capabilities to enable detection, classification, and mapping of underwater sites contaminated with unexploded ordnance either partially or fully buried in sediment. Completed initial design of technology demonstration system and developed aided target recognition processor for multi-sensor detection of fully or shallow buried ordnance and explosive waste (OEW) targets ranging in size from small artillery shells to large bombs; established discrimination capability between OEW targets and clutter; developed real-time processing of sensor suite data and real-time aided target recognition; developed real-time mapping of survey field and targets and post processing review of data including bathymetry and display of the multi-sensor information for each target. The highly successful phase I at-sea feasibility demonstration exhibited sensor detection capability and model validation against OEW targets using existing sensors, post-processing for target recognition, and three-dimensional visualization.

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**-Multi-Sensor Data Fusion:** Initiated data fusion efforts to integrate existing sensor technology to detect and classify subsurface UXOs as recommended by the FY 1995 SERDP funded MIT Lincoln Lab report on a Research Development Strategy for UXO sensing. Assembled Technical Oversight Committee (TOC) for multisensor data fusion. Solicited evaluations from other UXO technology demonstration participants.

(U) **Trichloroethylene (TCE) Risk Assessment:** This continuing Tri-Service research initiative provided crucial results to create a robust foundation for scientifically-based assessment of TCE health risks. Estimated costs for clean-up of contaminated groundwater to current TCE drinking water standards are in the billions of dollars for DoD alone. This research is expected to provide a sound basis for reviewing and possibly raising the TCE standard. The accomplishments of this SERDP-funded project have already persuaded the EPA to put TCE on the "fast-track" for (re-)evaluation of health risks. (\$.9 Million)

(U) **Natural Attenuation of Explosive Contaminants:** This new start project may justify pursuing natural attenuation approaches in lieu of costly cleanup approaches. Includes an investigation of effective biomarkers, such as microbial DNA and/or lipid signatures, and stable isotope techniques that indicate the degradation of explosives. Developed a technique for adapting a stable isotope for natural attenuation monitoring. Developed an approach for integrating stable isotope data into existing explosives remediation code as well as protocol biomarker sampling. Optimized lipid and DNA extraction protocols and catabolic gene probes. Initiated measurement of stable isotope ratios of TNT and RDX. These investigation efforts include the research aspects of a concurrent demonstration/validation project under the DUSD(ES) Environmental Security Technology Certification Program (ESTCP). The potential cost savings with a successful application of this technology for site cleanup are very high. (\$.8 Million)

(U) **Lead-Based Paint (LBP) Hazard Mitigation:** Develops and demonstrates a novel vitrification technology to remove and immobilize lead and other heavy metals in paints, and other technologies for reducing worker and public exposure to lead during lead abatement efforts. This project has developed a thermal spray vitrification process which reduces lead leach rates below Toxicity Characteristic Leachate Procedure (TCLP) limits from metallic substrates and developed a micro-wave based process for removal and vitrification of LBP from non-metallic surfaces. A ten percent reduction in the cost of LBP abatement could result in a return on investment of 25:1. (\$.7 Million)

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(U) **Fluorinated Ship-hull Coatings for Non-polluting Fouling Control:** Investigates non-polluting, fouling resistant or fouling release, Navy ship-hull coatings that exploit the low surface energy of surface-oriented perfluorinated alkyl compounds. These coatings are too smooth for biofouling organisms to attach themselves. This project has initiated field testing of selected candidate coatings. (\$.606 Million)

(U) **Non-Thermal Plasma (NTP) Technology for Reduction of Atmospheric Emissions:** Assesses and develops non-thermal plasma reactor technology and demonstrates a pilot-scale reactor for the reduction of atmospheric emissions as a new start in FY96. Specifically, NTP technology is intended to address emissions of oxides of nitrogen and volatile organic compounds from jet engine test cells, ordnance manufacturing, painting operations and marine diesel and gas turbines. (\$.5 Million)

(U) In addition to the above mentioned projects, SERDP funded 56 other technology development work units in the areas of Cleanup, Pollution Prevention, Compliance, Conservation, and Global Environmental Change. (\$37.807 Million)

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**(U) FY 1997 Plans:**

**(U) Whale Monitoring Using Integrated Undersea Surveillance Systems (IUSS):** Continuing project will provide a capability to monitor marine mammal activities over the long term and to minimize adverse impacts, including low frequency sound effects, to marine mammals from Naval testing, training, and operational missions. In close coordination with NOAA, this project plans to conduct a field experiment in the Pacific and provide a report on IUSS marine mammal population and location estimation. (\$2.3 Million)

**(U) Unexploded Ordnance (UXO) Detection:** Continuing project that is developing and integrating UXO detection, location, and discrimination sensor technologies for both land and underwater use. Tasks include: a) physical, biological, and chemical phenomenological impacts on sensor response; b) development/modification of data fusion capabilities; c) development/modification of UXO discrimination techniques, and d) demonstrate processing capabilities to enable detection, classification, and mapping of underwater sites contaminated with unexploded ordnance either partially or fully buried in sediment. Will complete examination of existing data fusion algorithms. (\$2.395 Million)

**(U) DoD National Environmental Technology Test Sites Program:** This continuing project, intended to facilitate transfer to field use new, innovative, cost savings cleanup technologies, is fully operational and plans to host 15-20 field tests and demonstrations of innovative remedial and site characterization technologies at the five test locations. Installation of an additional high value controlled release cell will be completed at Dover AFB. Many of the planned demonstrations will be current SERDP projects; several will be from other funded programs, such as the Advanced Applied Technology Demonstration Facility and the Environmental Security Technology Certification Program. (\$2.075 Million)

**(U) Accelerated Tri-Services Site Characterization and Analysis Penetrometer System Sensor Development (SCAPS):** Project to be completed in FY 1997. Project aggressively moves to demonstrate cost-effective detection sensors on the Tri-Services SCAPS platform and plans to complete a series of final field demonstrations, including: the Laser Induced Breakdown Spectroscopy sensor and the X-Ray Fluorescence sensor for heavy metals detection; the Fiber Optic Raman Spectroscopy sensor for VOCs; and the Laser Induced Fluorescence sensor for POLs, explosives and solvents. Final demonstration of SCAPS sampling technology will provide alternative cost-effective methods to obtain site characterization and verification data. (\$2.05 Million)



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- (U) **Integrated Biotreatment Research Program: From Flask to Field:** This umbrella project, to be completed in FY 2000, represents a collective research initiative by several key government, private sector, and academic organizations supporting and investing in the development and application of innovative biotreatment technologies. The project plans to field several biotreatment processes that address the remediation of predominant DoD contaminants. (\$1.955 Million)
- (U) **Next Generation Fire Suppression Technology Program (NGFSTP):** This umbrella project which begins in FY 1997 is part of the NGFSTP for the replacement of Halon 1301 in DoD weapon systems. It is divided into the following six fully integrated technical focus areas each with sequential and synergistic research elements (a total of 32 research elements): (1) Risk Assessment and Selection Methodology 2) Fire Suppression Principles 3) Technology Testing Methodologies 4) New Suppression Concepts 5) Emerging Technology Advancement and Suppression Optimization. Nine research projects will address Mechanisms of Ultra-High Efficiency Chemical Suppressants, Suppression Dynamics of Fine Droplets and Particles, Stabilization of Flames, Suppression System Effectiveness Screening, and Advanced Propellants/Additive Development for Gas Generators. (\$1.3 Million)
- (U) **Characterize Open Burning/Open Detonation (OB/OD) Emissions:** Project to be completed in FY 1997. The impact of OB/OD on soil will be characterized; real-time multi-pollutant monitoring systems will be developed; OB/OD methods to optimize combustion effectiveness will be improved; modeling of air pollution dispersion; characterization of emissions from energetic materials will be completed; and a final report on the first subsurface BangBox test will be issued. Acceptance of this report by regulators will result in substantial savings to DoD from energetics demilitarization. (\$1.295 Million)
- (U) **Aquifer Restoration by Enhanced Source Removal:** Continuing project to provide field demonstrations of innovative processes to remediate aquifers contaminated by non-aqueous phase liquids (NAPLs) including fuels, solvents and other organic contaminants in a timely and cost-effective manner. NAPLs to be removed consist of light and dense non-aqueous phase liquids (LNAPLs and DNAPLs) that are trapped in varying geologic settings. The project will develop guidelines for applying these processes to remediate contaminated groundwater. The project will focus both on utilizing these processes to enhance pump-and-treat contaminant removal technologies and to produce engineering design guidance documents for applying to clean up contaminated groundwater. (\$1.02 Million)

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- (U) **Trichloroethylene (TCE) Risk Assessment:** Project to be completed in FY 1997. Project will successfully complete a dosimetry and risk assessment which encompasses Physiologically-Based Pharmacokinetic (PBPK) modeling, the development of a Biologically-Based Pharmacokinetic (BBPK) model, and the extrapolation of rodent risk to human risk. Will investigate and elucidate the TCE metabolic pathways and the metabolic differences across species. Responses associated with tumor promotion and the evaluation of PBPK modeling suitability will also be investigated. Resulting information and data may justify a substantial cost saving in the TCE cleanup. (\$.75 Million)
- (U) **Natural Attenuation of Explosive Contaminants:** Continuing project to characterize field samples with gene probing, and to provide rate parameters and site capacity data for field soils. Complete radio respirometry analysis on lipid fractions from field samples. Update conceptual model based on new grid site cone penetrometer/hydro penetrometer data. Validate microbial lipid assays for community structure with direct field samples. Conduct mesocosm incubations with time-series isotope tests. Conduct two-day Tri-Service workshop on monitoring tools for natural attenuation of explosives as part of the technology transfer of the project products to DoD users. (\$.75 Million)
- (U) **Clean, Agile Manufacturing of Energetics:** Project to be completed in FY 1997. Project will develop integrated product/process technologies and tools to metamorphose existing PEP manufacturing and demil facilities into a clean, agile enterprise that will function economically with total life-cycle wastes reduced by 90%. Pilot plant production of next generation PEP materials and experimental verification of waste reduction will be completed. Demonstration of a bomblet process control method which reduces rejects by 90% over the current method will be demonstrated. Life-cycle analysis and simulation software tool development for waste reduction in PEP manufacturing processes will be completed. (\$.6 Million)
- (U) **Lead-Based Paint (LBP) Hazard Mitigation:** Continuing project that will develop and demonstrate a novel vitrification technology to simultaneously remove and immobilize lead and other heavy metals and technologies during the removal of lead-based paint. This technology will also reduce worker and public exposure to lead during paint removal efforts. The alpha version of a lead hazard mitigation management system will be developed to aid in optimizing abatement strategies for LBP. (\$.6 Million)

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(U) **Non-Thermal Plasma (NTP) Technology for Reduction of Atmospheric Emissions:** Continuing project that will develop NTP reactor scaling criteria for NTP technologies and optimization models. A laboratory-scale development of DoD-relevant application criteria will be established. (\$525 Million)

(U) **Fluorinated Ship-hull Coatings for Non-polluting Fouling Control:** Project to be completed in FY 1997. A new toxic free coating to resist or reduce the attachment of marine fouling organisms to ships will be developed under this project. This project plans to correlate fouling performance of acrylate polymers with coating surface properties and polymer molecular structure. Fluorinated oxetane and siloxane containing sol-gel coatings will be developed, tested and synthesized. (\$.3 Million)

(U) Additional efforts will continue in Cleanup, Compliance, Conservation, and Pollution Prevention. There are 25 other projects in Pollution Prevention, including pesticide risk reduction. Planned new start activities in the Pollution Prevention area that directly respond to the highest priority defense environmental mission-relevant requirements include: Elimination of Toxic Materials and Solvents from Solid Propellant Components; Low VOC Chemical Agent Resistant Coatings (CARC); and Toxic Elimination from Small Caliber Ammunition. (\$14.787 Million)

(U) There are 11 other projects in Cleanup. Planned new start activities in the Cleanup area that directly respond to the highest priority defense environmental mission-relevant requirements include: Unexploded Ordnance (UXO) Detection; Bioenhanced In-Well Vapor Stripping to Treat TCE; and Development of Simulators for In-Situ Remediation Evaluation, Design, and Operation. (\$6.762 Million)

(U) There are 14 other projects in Compliance. Planned new start activities in the Compliance area that directly respond to the highest priority defense environmental mission-relevant requirements include: Laser-based Spectrometers for Measurement and Monitoring of Toxic Metals and Organic Emissions, and Detection and Identification of Multiple Hazardous Air Pollutants at Extended Distances. (\$7.723 Million)

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- (U) There are 11 other projects in Conservation. Planned new start activities in the Conservation area that directly respond to the highest priority defense environmental mission-relevant requirements include: Risk Assessment Framework for Natural and Cultural Resources on Military Training and Testing Lands, and Analysis and Assessment of Military and Non-Military Impacts on Biodiversity: A Framework for Environmental Management on DoD Lands Using the Mojave Desert as a Regional Case Study. (\$5.458 Million)
- (U) FY 1998 Plans:
- (U) **Next Generation Fire Suppression Technology Program:** This umbrella project which began in FY 1997 is part of the NGFSTP for the replacement of Halon 1301 in DoD weapon systems. In FY 1998, this project will complete the development of model fires for fire suppression research, and develop a better understanding of flame stabilization through modeling. Existing projects will be continued and sixteen new projects will be initiated under the Emerging Technology Advancement and Suppression Optimization focus areas and the other four focus areas. (\$3.5 Million)
- (U) **Unexploded Ordnance (UXO) Detection:** Continuing project to integrate and automate UXO detection, identification, and discrimination sensor technologies to include wide-area, rapid coverage over a variety of terrains of UXO-contaminated areas. Complete design and testing of multisensor data fusion algorithm using existing data. Complete an enhanced prototype multisensor platform data fusion procedure. Complete final data analysis from a demonstration of Mobile Underwater Debris Survey System (MUDSS) sensor and processing capabilities to enable detection, classification, and mapping of underwater sites contaminated with unexploded ordnance either partially or fully buried in sediment. (\$2.88 Million)
- (U) **DoD National Environmental Technology Test Sites Program:** Continuing project, intended to facilitate transfer to field use of new, innovative, cost savings cleanup technologies, is operational and plans to host 15-20 field tests and demonstrations of innovative remedial and site characterization technologies at the five test locations. Many demonstrations will be current SERDP projects; several will be from other funded programs, such as the Advanced Applied Technology Demonstration Facility and the Environmental Security Technology Certification Program. (\$2.84 Million)

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- (U) **Integrated Biotreatment Research Program: From Flask to Field:** Continuing umbrella project to be completed in FY 2000. Project represents a collective research initiative by several key government and academic organizations supporting the development of bioremediation treatment technologies. The research objective is to field several biotreatment processes for remediation of predominant DoD contaminants. The project plans to complete bench scale studies for explosives and intermediate scale studies for chlorinated solvents. (\$2.6 Million)
- (U) **Aquifer Restoration by Enhanced Source Removal:** Continuing project to demonstrate processes for enhancing removal of light and dense non-aqueous phase liquids (LNAPLs and DNAPLs) in a variety of geologic settings and develop guidelines for applying these processes to remediate contaminated groundwater. The guidance will address the entire remediation effort, including site characterization and support to achieve maximum benefit from the remediation technologies. A series of field demonstrations of enhanced pump-and-treat technologies will be conducted. Preliminary test results indicate removal of 80% to 100% of most contaminants. (\$2.48 Million)
- (U) **Whale Monitoring Using Integrated Undersea Surveillance Systems (IUSS):** Continuing project will complete demonstration of a near real-time communication link for data distribution to automate detection and classification processes for marine mammals. Complete at-sea tests to assess the impacts of low-frequency sound sources on mammals. Project results should provide the Navy with the tools and analytical capability to comply with the Marine Mammal Act. (\$2.04 Million)
- (U) **Elimination of Toxic Materials and Solvents from Solid Propellant Components:** Continuing project, to eliminate (minimize) the use of lead compounds as a ballistic catalyst in reduced smoke propellants, and eliminate HCl as a combustion product of tactical and strategic booster propellants by using thermoplastic elastomers developed under service and SERDP funding in the Clean Agile Manufacturing Energetics project. (\$1.42 Million)
- (U) **Natural Attenuation of Explosive Contaminants:** Continuing project addresses: development of unique microbial monitoring tools by identifying and establishing geological characteristics needed to determine the rate and extent of natural attenuation; and development of guidance on methods for monitoring site-specific rate parameters, site capacity, and mass balance of explosives. Complete integration of stable isotope monitoring technology into explosives remediation model. (\$1.0 Million)

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- (U) **Toxic Elimination from Small Caliber Ammunitions:** Continuing project to eliminate hazardous materials in the bullet core and primer of small caliber ammunition while meeting U.S. and NATO performance requirements. Includes studies to replace lead azide in primer using metastable interstitial composites, and lead antimony in the core using tungsten and tungsten composites. (\$.9 Million)
- (U) **Lead-Based Paint Hazard Mitigation:** Project to be completed in FY 1998. Field tests and demonstrations of vitrification technologies for immobilizing heavy metals during lead removal activities will be conducted at DoD installations. Other removal technologies will be evaluated to minimize worker and public exposure. (\$.75 Million)
- (U) **Non-Thermal Plasma (NTP) Technology for Reduction of Atmospheric Emissions:** Continuing project that will develop NTP reactor scaling criteria for NTP technologies and optimization models. Scale-up of NTP reactors will be optimized and a design of a field-pilot NTP reactor unit will be completed. The field-pilot unit will be tested to provide criteria for selecting the most appropriate NTP technology for DoD applications. (\$.575 Million)
- (U) **Analysis and Assessment of Military and Non-Military Impacts on Biodiversity: A Framework for Environmental Management on DoD Lands Using Mojave Desert As A Regional Case:** Continuing project to provide DoD with capability (including techniques, tools, and training) to most effectively carry out its military mission in the context of regional management of biodiversity and related environmental considerations and to consider them not only within the boundaries of the installations but also in the context of the surrounding stakeholders and the cultural and natural resources they manage. (\$.55 Million)
- (U) **Trapped Vortex Combuster for Jet Engines:** Continuing project will develop design rules for and demonstrate the feasibility of a trapped vortex combustor for reducing the NOx, VOC, and CO emissions from aircraft, land and marine gas turbine engines by 60%. Project will provide design data for a pilot scale, 12" annular section of a trapped vortex combustor. Cavity size and injector loading design optimization will be completed. (\$.5 Million)

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- (U) **Development and Demonstration of a Risk Assessment Framework for Natural and Cultural Resources on Military Training and Testing Lands:** Continuing project to develop a structured, scientifically valid risk assessment framework that can be rapidly and cost-effectively applied to assess risks of single, multiple or cumulative impacts of military training and testing activities on DoD's natural and cultural resources. (\$43 Million)
- (U) **Ecological Modeling for Military Land Use Decision Support:** Project to be completed in FY 1998. Project plans to develop capability to enhance land use on natural resources management for DoD training activities. It will finalize an ecological population dynamics model and conduct field tests of vegetation dynamics and population dynamics models at DoD sites. (\$.4 Million)
- (U) Approximately 10 other continuing projects and 9 new start activities in Pollution Prevention are planned that directly respond to the highest priority defense environmental mission-relevant requirements include: Aircraft De-Icing/Anti-Icing, Minimization of Oily and Non-oily Wastes, Alternate Materials and Processes for Tactical Vehicle Washing, Non-Toxic Aircraft Sealants, Green Gun Barrels, Composites Repair and Remanufacturing, Non-hazardous Solid Waste Reduction (Packaging), and Manufacturing/Industrial In-Process Recycle/Recovery. (\$10.753 Million)
- (U) Approximately 4 other continuing projects and 4 new start activities are planned in the Cleanup area that directly respond to the highest priority defense environmental mission-relevant requirements include: Novel UXO Sensors, Dense Nonaqueous Phase Liquid (DNAPL) Identification and Remediation, Soil/Sludge/Sediment Treatment, and Risk Based Cleanup Assessment Techniques. (\$6.978 Million)
- (U) Approximately 7 other continuing projects in Compliance and 5 new start activities are planned in the Compliance area that directly respond to the highest priority defense environmental mission-relevant requirements include: Destruction of Energetics, Particulate Emission Characterization, Control/Destruction of Nitrogen Oxide (NOx) Emissions, and Control/Destruction of Volatile Organic Compound (VOC) Emissions, Minimization of Oily and Non-Oily Waste. (\$8.574 Million)

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(U) Approximately 2 other continuing projects in Conservation and 7 new start activities are planned in the Conservation area that directly respond to the highest priority defense environmental mission-relevant requirements include: Error and Uncertainty Analysis for Ecological Modeling and Simulation; Assessment and Prediction of Noise Effects on the Environment; Training and Testing Activity Impacts; Mitigation/Rehabilitation of Military Training and Testing Impacts; Landscape Based Change Detection; and Ecosystem Fragmentation. (\$5.694 Million)

(U) FY 1999 Plans:

(U) **Next Generation Fire Suppression Technology Program:** This 8 year umbrella project which began in FY 1997 is part of the NGFSTP for the replacement of Halon 1301 in DoD weapon systems. In FY 1999, this project will finalize data on in-flight ullage conditions and complete the development of test methodology on the toxicity, environmental impact, materials compatibility, and principal degradation products. Projects will be initiated under the New Suppression concepts and Emerging Technology Advancement focus areas. Additionally, efforts will continue in all six focus areas. (\$3.5 Million)

(U) **DoD National Environmental Technology Test Sites Program:** The Program is fully operational and plans to host 15-20 field tests and demonstrations of innovative remedial and site characterization technologies at the five test locations. Location Managers will provide to the SERDP Executive Director plans to make their sites become self-sufficient with a minimal baseline funding provided by SERDP. Many demonstrations will be current SERDP projects; several will be from other funded programs, such as the Advanced Applied Technology Demonstration Facility and the Environmental Security Technology Certification Program. (\$2.44 Million)

(U) **Integrated Biotreatment Research Program: From Flask to Field:** Continuing umbrella project to be completed in FY 2000. Project represents a collective research initiative by several key government and academic organizations supporting the development of bioremediation treatment technologies. The research objective is to field several biotreatment processes for remediation of predominant DoD contaminants. The project plans to complete bench scale studies for explosives and intermediate scale studies for chlorinated solvents. (\$2.25 Million)

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- (U) **Unexploded Ordnance (UXO) Detection:** Continuing project to detect UXO's which is the highest priority within the SERDP Cleanup Technology Thrust Area. Represents a collective research initiative for the development and integration of multi-sensors and data fusion software for the location, identification, discrimination, and delineation of UXO's. (\$3.65 Million)
- (U) **Aquifer Restoration by Enhanced Source Removal:** Project to be completed in FY 1999. Project is providing processes for removal of dense non-aqueous phase liquids (DNAPL) in a variety of geological settings and will develop guidelines for applying these processes to remediate contaminated groundwater. This guidance has addressed the entire remediation effort, including site characterization and support to achieve maximum benefit from the remediation technologies. A series of field demonstrations of enhanced pump-and-treat technologies has been completed. Preliminary test results indicate removal of 80-100% of most contaminants. (\$1.3 Million)
- (U) **Elimination of Toxic Materials and Solvents From Solid Propellant Components:** Continuing project to develop lead free extrudable and castable propellant for minimum smoke missile systems; demonstrate complete and clean, HCl-free combustion of propellant; and develop solventless (liquefied gases and supercritical fluids) methods for manufacturing oxidizers. Project will complete optimization and development of new energetic formulations for replacing lead and HCl and complete the development of a solventless process for clean manufacture of oxidizers. (\$1.32 Million)
- (U) **Minimization of Oily and Non-Oily Shipboard Waste:** Continuing and expanded FY 1998 project to develop equipment and procedures for the minimization and treatment of shipboard non-oily and oily wastes. Non-oily wastes include sewage, laundry and scullery waters, showers and sink waters. Oily wastes are those derived from lubricants and fuels. The primary benefit of this research will be to ensure compliance with international maritime laws and treaties and will enable DoD ships to operate unrestricted anywhere in the world. (\$1.72 Million)
- (U) **Destruction of Energetics:** Continuing FY 1998 project to focus on evaluating methods of energetics destruction that are safe, economical, and comply with current and pending regulations. (\$1.1 Million)

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(U) **Development and Demonstration of a Risk Assessment Framework for Natural and Cultural Resources on Military Training and Testing Lands:** Continuing project to maximize use of DoD available training and testing land areas by developing and demonstrating a consistent, defensible, and easily implemented framework for assessing risks to natural and cultural resources. Most research effort will focus on demonstrating the framework developed in FY 98. (\$6 Million)

(U) **Toxic Elimination From Small Caliber Ammunition:** Continuing project will develop tungsten-based materials to replace lead-antimony in projectile cartridge, and develop Metastable Interstitial Composites (MIC) to eliminate heavy metals from primer compositions for small caliber ammunition. Project will complete bio-uptake and environmental studies of improved non-toxic materials for replacing lead-antimony in projectile cartridges, conduct accelerated aging and environmental/climatic storage tests on MIC, and develop an industrial process for MIC primer fabrication and assembly. (\$6 Million)

(U) **Analysis and Assessment of Military and non-Military Impacts on Biodiversity: A Framework for Environmental Management on DoD Lands Using Mojave Desert As A Regional Case:** Continuing project to provide DoD with capability (including techniques, tools, and training) to most effectively carry out its military mission in the context of regional management of biodiversity and related environmental considerations and to consider them not only within the boundaries of the installations but also in the context of the surrounding stakeholders and the cultural and natural resources they manage. Emphasis will be on defining species-habitat relationships and developing alternative future scenarios. (\$55 Million)

(U) **Trapped Vortex Combuster for Jet Engines:** Project to be completed in FY 1999 and transitioned to Integrated High Performance Turbine Engine Technology (IHPTET) Program. Project will develop design rules and demonstrate the feasibility of a trapped vortex combustor for reducing the NOx, VOC, and CO emissions from aircraft, land/marine gas turbine engines by 60%. The trapped vortex combustor is expected to reduce specific fuel consumption by 3%. (\$5 Million)

(U) **Pesticides Reduction Using Precision Targeting:** Project to be completed in FY 1999. Recommendations, final report, software, and preliminary training documentation will be provided to Armed Forces Pest Management Board. The project will develop techniques to reduce

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APPROPRIATION/BUDGET ACTIVITY: RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE: STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM PE 0603716D	

DoD pesticide use and associated risks using "Precision Targeting" in comparative risk assessment and reduction processes. Will develop a standardized system to reduce pesticide use that is comprehensive, verifiable, documentable, and portable. (\$.3 Million)

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: FEBRUARY 1997
APPROPRIATION/BUDGET ACTIVITY: RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE: STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM PE 0603716D	

(U) **Detection and Identification of Multiple Hazardous Air Pollutants (HAPs) at Extended Distances:** Two continuing Proof of Concept projects are addressing the issues of compliance and pollution prevention needs of military installations. One is the development of an ultra broad-band radiation technology for remote detection of HAP emissions at extended distances. The second is a combination infrared spectrometer for gaseous effluents and an induced breakdown spectrometer to monitor metals emissions, both of which use new laser technologies. Preliminary experiments on chemical identification will be performed. (\$1.05 Million)

The balance of the program includes approximately 26 continuing projects and 7 new start efforts. All planned new start activities directly respond to the highest priority defense environmental mission-relevant requirements. Thrust profiles follow:

(U) Approximately 11 other projects in Pollution Prevention will continue. Representative activities may include: evaluating innovative pollution prevention technologies, processes, and environmental management practices to eliminate wastes, effluents, or emissions at DoD/DOE manufacturing and maintenance activities; applying life cycle analysis and design models that can identify alternatives to hazardous materials in defense process waste streams. (\$11.225 Million)

(U) Approximately 4 other projects in Cleanup will continue. Representative activities may include: demonstrating novel UXO detection sensors, DNAPL remediation technologies, and simulations of cleanup activities. (\$9.805 Million)

(U) Approximately 6 other projects in Compliance will continue. Representative activities may include: novel approaches to control air emissions. (\$7.578 Million)

(U) Approximately 11 other projects in Conservation will continue. Representative activities may include: application of novel terrain models to enhance land-use management in training and testing environments, novel methods to inventory, monitor, and assess natural and cultural resources; and development of strategies for noxious species management. (\$8.597 Million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE: FEBRUARY 1997
APPROPRIATION/BUDGET ACTIVITY: RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE: STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM PE 0603716D	

(U) B. <u>Program Change Summary.</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>To Complete</u>	<u>Total Cost</u>
Previous President's Budget	55.859	54.880	56.167	59.165	Continuing	Continuing
Appropriated Value		54.880				
Adjustments to Appropriated Value						
a. Congressional undistributed reduction	(1.423)	(1.405)				
b. Rescission/Below-threshold reprogramming						
c. Other			(1.293)	(1.980)		
Current President's Budget	54.436	53.475	54.874	57.185	Continuing	Continuing

Change Summary Explanation: funding changes are the result of Defense Program Review.

(U) C. Other Program Funding Summary. None

(U) D. Schedule Profile. Not Applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense -wide/BA 3					R-1 ITEM NOMENCLATURE JOINT WARFIGHTING INTEGRATION PROGRAM PE 0603726D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Total Program Element (PE) Cost	3.228	0	0	0	0	0	0	0	3.228	3.228
Project Name/No. and Subtotal Cost JWIP/P528	3.228	0	0	0	0	0	0	0	3.228	3.228

(U) A. Mission Description and Budget Item Justification

(U) **BRIEF DESCRIPTION OF ELEMENT:** The JWIP is under Budget Activity 3 because this program funds the integration and demonstration of advanced technology for field experimentation and assessment. The result of the JWIP efforts is an integration of the demonstrated technological capabilities in addition to the development of concepts of operation by the joint forces. This leads to greatly improved understanding of the Joint Warfighting utility and value assessed in realistic operational context. Whereas the Military Services provide air, land, and naval technological superiority, and ACTDs rapidly prototype and transition technological solutions to specific threat scenarios, the JWIP provides timely resources and flexibility to horizontally integrate across services and experiments with providing joint warfighting solutions during computer assisted joint warfighting exercises.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense -wide/BA 3	R-1 ITEM NOMENCLATURE JOINT WARFIGHTING INTEGRATION PROGRAM PE 0603726D	February 1997

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) **FY 1996 Accomplishments:** In May 1996 funding was provided for the Joint Operations Visualization Experiment (JOVE) for Unified Endeavor (UE) 96-2. The JOVE project exceeded FY 1996 program objectives by demonstrating a significant capability for increasing the battlespace awareness of a Joint Task Force Commander and enhancing information superiority for the joint warfighter. Evaluation of the JOVE was performed by United States USACOM Joint Training Analysis and Simulation Center (JTASC) with a revolutionary operational capability for fusing air, land, surface and subsurface data feeds into a single fused operational picture of the entire Area of Operations (AOR). JOVE provided this first ever capability for significantly increasing awareness of the joint battlespace through aggressive application of rapidly emerging state-of-the-art commercial 3-D visualization hardware and software technology. The immediate payoff of the operational evaluation of JOVE at JTASC was improved training during Unified Endeavor 96-2, resulting from the capability of JOVE to visualize and replay significant training events. The significant success of the operational evaluation of JOVE at USACOM JTASC has resulted in a decision by the Joint Staff Director for C-4 Systems to rapidly accelerate fielding of JOVE capabilities to the joint warfighting. (\$1.000 Million).

(U) Funding was also provided to accelerate the USMC Sea Dragon Warrior by six months. This effort linked Army-lead Mobile Operations in Urban Terrain (MOUT) and USMC-lead Sea Dragon joint evaluation of promising non-lethal weapons technologies and concepts. In September 1996, a report documented the impact of promising non-lethal weapons technology on USMC Sea Dragon Urban Warrior and Army/USMC MOUT warfighting concepts, tactics, techniques, and procedures. (\$2.228 Million).

(U) FY 1997 Plans: Program Terminated

(U) FY 1998 Plans: Program Terminated

(U) FY 1999 Plans: Program Terminated



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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense -wide/BA 3	R-1 ITEM NOMENCLATURE JOINT WARFIGHTING INTEGRATION PROGRAM PE 0603726D	

- (U) Provide an Acquisition Strategy: Not Applicable
- (U) B. Other Program Funding Summary Cost Not Applicable
- (U) C. Schedule Profile Not Applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3		R-1 ITEM NOMENCLATURE Joint Warfighting PE 0603727D								
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	14.172	22.833	27.293	31.334	31.142	32.026	Continuing	Continuing
Project Name/No. and Subtotal Cost JW/P727	0	0	14.172	22.833	27.293	31.334	31.142	32.026	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

**(U) BRIEF DESCRIPTION OF ELEMENT:** The Chairman of the Joint Staff's Joint Vision 2010, the Services' 21st Century visions and the Revolution in Military Affairs all stress the criticality of information superiority to achieve full spectrum force dominance. Information superiority is fundamental to achieving dominant maneuver, precision engagement, full dimensional protection and focused logistics. The Joint Staff Director for Command, Control, Communications and Information systems (J6) and Director of Defense Research & Engineering recently lead the Advanced Battlespace Information System (ABIS) Task Force which produced the most comprehensive assessment, vision and strategy to date for achieving the requisite grid, battlespace awareness and precision engagement technologies and concepts to make JV2010 possible. The 1997 edition of the Joint Warfighting Science and Technology Plan provided to Congress in compliance with the Fiscal Year 1997 Defense Authorization Act (Section 1052) presents the technology investment plan consistent with JV2010 and the ABIS recommendations. This Program Element funds the field experiments and supporting simulation to evaluate progress toward achieving the JV 2010/ABIS objective by the end of the FYDP. The JWSTP defines and maps the requisite technology development and advanced concept technology demonstrations. This program element enables the joint warfighter and evolving service battle laboratory system as an integrated team to experiment and assess how these advanced technologies and concepts, along with emerging commercial off the shelf (COTS) and government off the shelf products, can combine to achieve the information superiority required by JV 2010/ABIS.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		<b>DATE</b> February 1997
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-wide/BA 3	<b>R-1 ITEM NOMENCLATURE</b> Joint Warfighting PE 0603727D	

(U) This program element provides the capability to rapidly incorporate new and emerging tools, products, and advanced concepts. We have the capabilities to establish and deploy this integrated environment today with commercial off the shelf (COTS) hardware and existing software (COTS, GOTS, and applications), incurring minimal cost in set-up and operation. This environment can then be utilized as an information technology backplane to leverage early prototypes in the context of the existing environment. Advanced concept prototypes would be "deployed" in this environment. This reduces the risk of new technologies since they can be exercised early, well in advance of development and fielding. The benefits of this program element include: cost-effective exercise by the warfighter/acquisition/technology team of prototypes early in the life cycle; the ability to test interoperability of prototypes with established legacy systems; early insight into the potential for increased joint combat power enabled by advanced information technology and concepts; better information system development and upgrade requirements; and more rapid insertion of information technologies.

(U) The JW is under Budget Activity 3 because this program funds the integration and demonstration of advanced technology for field experimentation and assessment of systems or systems. The result is an integration of the demonstrated technological capabilities in addition to the development of 21st Century warfighting concepts for joint forces. This leads to greatly improved understanding of the joint warfighting utility and value assessed in realistic, joint operational context. Whereas the Military Services provide air, land, and naval technological superiority, and ACTDs rapidly prototype and transition technological solutions to specific threat scenarios, this program provides timely resources and flexibility to horizontally integrate across services and experiments by providing joint warfighting solutions evaluated during joint warfighting exercises.

(U) This Program Element is in direct response to the FY 1997 Authorization Act Report 104-267, which call for "...a process to ensure that the emerging long-term visions of each of the Services will be melded into an affordable, coordinated series of operational concepts that will drive the JWSTP developed in the office of the DDR&E."

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3	R-1 ITEM NOMENCLATURE Joint Warfighting PE 0603727D	

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 1996 Accomplishments

(U) Not Applicable. This is an FY1998 start

(U) FY 1997 Plans:

(U) Since this is an FY1998 start, the detailed program plan and procurement package(s) will be developed. This will be a joint effort among the OSD, Joint Staff, Services and Agencies lead by the DDR&E and J6. The Joint Warfighting S&T Plan will be revised to include the resulting program and will be reviewed by the Joint Requirements Oversight Council and the Defense S&T Advisory Group. Procurement solicitations will be released following Congressional passing of the FY1998 Budget and Future Years Defense Plan.

(U) FY 1998 Plans:

(U) An information technology backplane compliant with the Joint Technical Architecture, ABIS and the initial joint warfighting operational architecture will be developed, thereby providing an environment of existing information technology components into which prototype and other emerging products can be inserted, exercised and evaluated with respect to interoperability and joint warfighting potential. Joint warfighter and acquisition personnel will experiment with several such prototypes in order to determine improved operational capabilities via field experiments, system integration laboratory, modeling, simulation, visualization, or other techniques. The detailed management and test plan will be completed for the initial joint warfighting experiment to be conducted as an embedded experiment in a joint training exercise in the year 2000 to determine progress, improve advanced joint warfighting concepts and evolve operational architecture. The information backplane will be expanded/improved based upon lessons learned from the Army's Force XXI warfighting experiments, the US Marine Corps' Sea Dragon initiative, Battle Laboratory and relevant ACTD efforts. Particular attention will be paid to linking the capabilities of several ACTDs including joint logistics, joint planning, rapid battlespace visualization, battlefield awareness data dissemination and SAIP. (14.172 Million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3	R-1 ITEM NOMENCLATURE Joint Warfighting PE 0603727D	

(U) FY 1999 Plans

(U) The JW experiment will be held, results analyzed, and the IT Backplane will be incrementally expanded with the successful components of the experiment. The process of transitioning JW programs to the User organization(s) will be the other major activity. A follow-on comprehensive JW experiment will also be planned. (\$22.833 Million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3	R-1 ITEM NOMENCLATURE Joint Warfighting PE 0603727D	

(U) B. <u>Program Change Summary</u>	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>To Complete</u>	<u>Total Cost</u>
Previous President's Budget	0	0	19.223	27.946	Continuing	Continuing
Appropriated Value						
Adjustments to Appropriated Value						
a. Congressionally-directed undistributed reduction						
b. Below-threshold reprogramming						
c. Other			(5.051)	(5.113)	Continuing	Continuing
Current President's Budget	0	0	14.172	22.833		

- (U) Change Summary Explanation:
- (U) Funding: Changes due to program budget adjustments..
- (U) Schedule: Not Applicable
- (U) Technical: Not Applicable
- (U) C. Other Program Funding Summary Cost: Not applicable.
- (U) D. Schedule Profile: Not Applicable

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3					R-1 ITEM NOMENCLATURE Agile Port Demonstration PE 0603728D					
<i>COST (In Millions)</i>	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	4.897	0	0	0	0	0	0	0	4.897
Project Name/No. and Subtotal Cost APD/P728	0	4.897	0	0	0	0	0	0	0	4.897

**A. Mission Description and Budget Item Justification**

**(U) BRIEF DESCRIPTION OF ELEMENT:** The goal of the program is to support the development and deployment of advanced concepts and technologies leading to an automated, fully-integrated, multi-modal Defense Transportation System (DTS) able to meet the needs of the 21st century. The Center for Commercial Development of Transportation Technologies (CCDoTT) is a DoD funded consortium of public, private, and academic activities brought together to identify and deploy advanced technologies that can be systematically integrated into ports and other transportation systems supporting both commercial and DoD transportation requirements. The purpose of the program is to compare traditional transportation with next generation technologies, identify the potential for these new technologies to support DoD mobility requirements, and determine the scenarios and criteria for their economic use.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Agile Port Demonstration PE 0603728D	

(U) USTRANSCOM is the Technical Manager for CCDoTT and California State University Long Beach (CSULB) in the lead member for the CCDoTT Consortium. Other core members include MTMC and MTMC-TEA; various commercial activities including Alabama State Docks, BTG Inc., Parsons Brinckerhoff (PB), and Concurrent Technologies Corporation (CTC); and the Southern California Coalition for Education in Manufacturing Engineering (SCCEME) - A coalition of California Universities including USC, UCLA, UC-Fullerton, UC-Irvine, and CSULB.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1996 Accomplishments:

(U) DoD funding of CCDoTT originated as a consequence of suggestions in the "Defense Conversion and Reinvestment" section of the FY 1995 DoD Appropriations Bill Conference Report under the category of "Other Conversion Initiatives." The program was initially funded through a \$1.67M grant to the City of Long Beach California by the DoD Office of Economic Adjustment (OEA). The total FY 1996 budget for the program was \$1.85M, with the difference coming through participatory funding from the City of Long Beach and CSULB.

(U) The FY 1996 program was controlled through Memorandums of Understanding (MOU) between USTRANSCOM, the City of Long Beach, CSULB, and the DoD Office of Economic Adjustment (OEA). These MOUs identified the following six FY 1996 deliverables:

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Agile Port Demonstration PE 0603728D	

- (U) "Operational Concept Document (OCD)" to evaluate High Speed Sealift and Agile Port (HSS/AP) technologies as a means of deploying DoD unit and non-unit equipment and cargo.
- (U) "Advanced Technologies for Transportation Applications Technical Report" to evaluate existing and emerging HSS/AP technologies available for the DoD to leverage.
- (U) "Just in Time (JIT) Command and Control (C2) Technical Report & Simulation" to evaluate and demonstrate JIT technologies for application within the DTS.
- (U) "Cargo Identification Technical Report & Demonstration" to research and demonstrate the capability to automatically weigh and measure DoD vehicles and equipment in motion. The resulting system has been named the Transportation Automated Measuring System (TrAMS); formerly called the Profilometer/SHED.
- (U) "Equipment Evaluation/Design Technical Report" to identify methods of configuring HSS/AP technology to support DoD requirements.
- (U) "High Speed Sealift/Agile Port Project Plan" for demonstrating HSS/AP Technology for the DoD.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE	
	Agile Port Demonstration PE 0603728D	

(U) FY 1997 Plans:

- (U) Current CCDoTT efforts involve the continued research and development of advanced technologies supporting DoD Mobility. The focus of these efforts involve the continued development of automated measurement capabilities for DoD vehicles and equipment (TrAMS) and the leveraging of high speed sealift and agile port technologies being developed (or considered for development) by commercial entities. Funding and specific FY 1997 work include: (\$4.897 Million)
- (U) FY 1997 funding includes \$5M R&D funds provided through the FY 1997 Defense Appropriation Bill Conference Report. The initiative, titled "Agile Port Demonstration," provides funds for prototyping agile port facilities, high speed sealift & related technologies, and cargo/personnel movement, tracking and total asset visibility. The funds were specifically provided for the continuation of the current MOU with CCDoTT. A description of the research being planned is as follows:
  - (U) Advanced Sealift Technologies. Conduct research, development, testing, evaluation and commercialization of enabling technologies for high speed marine applications. Evaluate commercial ship designs and planned initiatives that can be effectively used for military support or adapted for use by the DoD. Develop configuration designs and/or required design changes to make next-generation lift platforms (surface effect ships, etc.) compatible with DoD Strategic & Tactical requirements and current DoD cargo handling systems. Perform research on high speed sealift propulsion systems, cargo transfer equipment, and other associated systems. Conduct modeling & simulation to assess and recommend sealift designs for systematic integration into the DTS.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Agile Port Demonstration PE 0603728D	

- (U) Agile Port Technologies. Conduct research and develop state-of-the-art port systems to decrease port congestion and increase port-mobilization capabilities. Develop, evaluate, and optimize Agile Port concepts and associated Intermodal Transfer (IT) to provide flexibility to DoD mobility, serve both commercial and military needs with efficiency and high throughput, and optimize cargo handling within Agile Port facilities. Capitalize on existing and emerging information technologies to interface Agile Ports with the DTS. Conduct modeling & simulation to perform design analysis supporting the seamless integration of Agile Ports into the DTS.
- (U) Rapid Deployment Technologies. Analyze the feasibility of leveraging advanced commercial Marine-Rail Interfaces in support of DoD intermodal deployments; conduct modeling and simulation to determine the impact of using marine-rail technology in cooperation with Inland Ports; continue the development of the Transportation Automated Measuring Systems (TrAMS) to incorporate advanced Weigh In Motion (WIM) technology; and perform analysis of various advanced technologies to determine their potential benefits on DoD mobility.

(U) FY 1998 Plans:

(U) Not Applicable

(U) FY 1999 Plans:

(U) Not Applicable

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Agile Port Demonstration PE 0603728D	

	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>To Complete</u>	<u>Total Cost</u>
(U) <u>B. Program Change Summary</u>						
Previous President's Budget	0	5,000	0	0	0	5,000
Appropriated Value						
Adjustments to Appropriated Value						
a. Congressionally-directed undistributed reduction		(.103)				(.103)
b. Below-threshold reprogramming						
c. Other						
Current President's Budget	0	4,897	0	0	0	4,897
(U) Change Summary Explanation:						
(U) Funding: No changes.						
(U) Schedule: Not Applicable						
(U) Technical: Not Applicable						
(U) <u>C. Other Program Funding Summary Cost:</u> Not applicable.						
(U) <u>D. Schedule Profile:</u> Not Applicable						

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE								
RDT&E, Defense Wide/BA 3		ROCKET LAUNCH FACILITY UPGRADE PE 0603729D								
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	9.795	0	0	0	0	0	0	0	9.795
Project Name/No. and Subtotal RLFU/P729	0	9.795	0	0	0	0	0	0	0	9.795

**A. Mission Description and Budget Item Justification**

**(U) BRIEF DESCRIPTION OF ELEMENT:** The Rocket Launch Facility Upgrade program provides for the modernization and improvement of the nation's launch facilities and infrastructure that will be used to support critical missile defense demonstrations and near term space launch missions. This program will evaluate the national ranges currently used to support both DoD and NASA mission requirements from a sub-orbital and orbital viewpoint and determine the upgrades required that will provide the biggest payoff. These upgrades will then be implemented at the selected range during the fiscal year. The ranges under consideration by this program are Poker Flat Research Range, Alaska, Wallops Island, Virginia and White Sands Missile Range, New Mexico.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		<b>DATE</b> February 1997
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-wide/BA 1	<b>R-1 ITEM NOMENCLATURE</b> ROCKET LAUNCH FACILITY UPGRADE PE 0603729D	

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1996 Accomplishments:

(U) Not Applicable - program begins in FY 1997

(U) FY 1997 Plans: The Department of Defense will:

\* Perform an evaluation of the three active ranges and their capabilities to assess their applicability for planned DoD and NASA requirements. This analysis will identify specific investments at a specific range to be funded. (\$1.0 million)

\* Fund infrastructure improvements at range. (\$7.0 million)

\* Research-related, infrastructure-building activities, for increased capabilities as identified during evaluation. (\$2.0 million)

(U) FY 1998 Plans:

(U) Not Applicable

(U) FY 1999 Plans:

(U) Not Applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 1	R-1 ITEM NOMENCLATURE ROCKET LAUNCH FACILITY UPGRADE PE 0603729D	

(U) ACQUISITION STRATEGY:

(U) B. <u>Program Change Summary</u>	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>To Complete</u>	<u>Total Cost</u>
Previous President's Budget	0	1,000	0.0	0.0	1,000	1,000
Appropriated Value						
Adjustments to Appropriated Value						
a. Congressionally-directed undistributed reduction		(.205)			(.205)	(.205)
b. Below-threshold reprogramming						
c. Other						
Current President's Budget	0	9,795	0.0	0.0	9,795	9,795

(U) Change Summary Explanation:  
 (U) Funding: Changes due to Congressional add.  
 (U) Schedule: Not Applicable  
 (U) Technical: Not Applicable

(U) C. Other Program Funding Summary Cost: Not applicable.

(U) D. Schedule Profile: Not Applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Airfield Surface Traffic Monitor PE 0603730D								
RDT&E, Defense Wide/BA 3										
COST ( <i>In Millions</i> )		FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Total Cost
Total Program Element (PE) Cost		0	1.959	0	0	0	0	0	0	1.959
Project Name/No. and Subtotal Cost ASTM/P730		0	1.959	0	0	0	0	0	0	1.959

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT:

(U) This program element was established in response to congressional guidance to increase safety on airfield critical movement areas by instrumenting runways and taxiways with inductive loop sensors that will provide improved situational awareness in high density or restricted visibility conditions for tower control personnel. The sensors provide classifications and speed information for aircraft and ground vehicles. The system will perform multi-sensor data fusion, including origin/destination training, to provide tracks of ground contacts for display on monitors. Covert sensor operation and system portability features will guard the security of military operations and permit a rapid relocation to expeditionary airfields.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1996 Accomplishments:

(U) Not Applicable. New start program (\$0)

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Airfield Surface Traffic Monitor PE 0603730D	
RDT&E, Defense Wide/BA 3		

(U) FY 1997 Plan

(U) The anticipated teams of companies will build, install, and demonstrate the inductive loop tracking system. The goal of this program is to 1) demonstrate the technology, 2) design a kit that is rapidly installable, and 3) use the kit to install the system at the selected airfield. The majority of system components will be put into a kit, yet every airfield is different enough to warrant a unique installation. Therefore, the early program focus will be on the development of an Airfield Installation Toolset computer application that will provide a quick and easy means to perform a rapid installation for each airfield. The Airfield Installation Toolset portion will walk the system installer through all system installation items. (\$1.959 million)

(U) FY 1998 Plans:

(U) Not Applicable One year program (\$0)

(U) FY 1999 Plans:

(U) Not Applicable One year program (\$0)

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	
RDT&E, Defense Wide/BA 3	Airfield Surface Traffic Monitor PE 0603730D	

<b>(U) B. <u>Program Change Summary</u></b>	<b><u>FY1996</u></b>	<b><u>FY1997</u></b>	<b><u>FY 1998</u></b>	<b><u>FY1999</u></b>	<b><u>To Complete</u></b>	<b><u>Total Cost</u></b>
Previous President's Budget Appropriated Value	-0-	-0- 2,000	-0-	-0-	-0- 2,000	-0- 2,000
Adjustments to Appropriated Value:						
a. Congressional Undistributed		(.041)			(.041)	(.041)
b. Below Thresholds						
c. Other Changes						
Current President's Budget	-0-	1,959	-0-	-0-	1,959	1,959

Change Summary Explanation:

Funding: New Start - Congressionally directed in FY 1997  
 Schedule: Not Applicable  
 Technical: Not Applicable

**(U) C. Other Program Funding Summary**    None

**(U) D. Schedule Profile**    Not Applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3					R-1 ITEM NOMENCLATURE Cooperative DoD/VA Medical Research Program PE 0603738D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Total Program Element (PE) cost	23.283	21.334	0	0	0	0	0	0	44.617	44.617
Project A Name/No. and Subtotal Cost	23.283	21.334	0	0	0	0	0	0	44.617	44.617
Coop DoD/VA Medical/P464										

(U) **A. Mission Description and Budget Item Justification:** Funding in this program element has been added by Congress to the DoD budget request each year since 1987. Funds support a "core (general research)" program of cooperative medical research supported by the Department of Defense (DoD) and managed by the Department of Veterans Affairs (VA). Core projects address medical research topics potentially of benefit to both Departments, such as infectious disease, trauma, stress and post-traumatic stress disorder. These projects are selected through a merit review process, and are conducted by intramural VA or DoD physicians and scientists. Funds also support Congressionally mandated research efforts, including Persian Gulf War Illnesses research, brain and spinal cord injury research, and prostate cancer research. Such efforts typically are managed by the U.S. Army Medical Research and Materiel Command, and may be performed by extramural or intramural scientists, following independent scientific peer review.

Project Number and Title: P464 Coop DoD/VA Medical

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(U) FY 1996 Accomplishments:

- (U) Initiated peer-reviewed research efforts concerning Persian Gulf War Illnesses in areas of epidemiology, pyridostyrgmine bromide, clinical research, and adverse health effects following chronic low level exposure to chemical warfare agents (\$7.482 million)
- (U) Continued epidemiologic studies comparing symptoms, hospitalizations and reproductive outcomes between Gulf War veterans and non-deployed veterans of the same era. Demonstrated that Gulf War veterans who remained on active duty were not at increased risk of hospitalization after the Gulf War. These studies were inter-Agency collaborations among DoD, Centers for Disease Control and Prevention, Environmental Protection Agency, Department of Veterans Affairs, and University of California at San Diego. Studies were endorsed by the Institute of Medicine, presented to the Presidential Advisory Committee for Gulf War Veteran Illnesses, and published in the peer reviewed literature. (\$2.221 million)
- (U) Initiated hazard assessment/exposure assessment toxicology research studies to enhance troop protection from exposure to harmful environmental chemicals during deployment. Studies include identification of biomarkers of toxic exposures; role of environmental chemicals in neurotoxicity, oxidative stress, immunotoxicity and cell transformation; and personnel and area dosimetry for environmental organics and inorganic chemicals or metals (\$1.609 million)
- (U) Initiated head and spinal cord injury research; supported completion of efforts initiated in 1992 for the Department of Defense Military Medical Personnel Collaborative Spinal Cord Injury, Paralysis, Neuroscience Research, Education and Training Center. (\$4.716 million)

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(U) Developed a coordinated investment strategy identifying core research topics of mutual interest to DoD and VA, including emerging pathogens; trauma and combat trauma; post-traumatic stress disorder and combat stress. Initiated a solicitation/award process for DoD and VA intramural research proposals concerning emerging pathogens. (\$7.255 million)

(U) FY 1997 Plans:

(U) Continue core research efforts concerning emerging pathogens. (\$1.8 million)

(U) Initiate core research efforts concerning trauma and combat trauma. (\$1.084 million)

(U) Initiate and continue research efforts to determine the etiology of Persian Gulf War Illnesses (\$12 million)

(U) New research efforts funded through this project will focus on the health consequences of possible exposure to sub-clinical levels of chemical warfare agents, the potential health effects of stress (i.e. somatization disorders, post-traumatic stress syndrome) and other PGI-related conditions (i.e., fibromyalgia). (\$10 million) Continuing research efforts are epidemiological studies comparing symptoms, hospitalizations and reproductive outcomes between Persian Gulf War veterans and non-deployed veterans of the same era. (\$2 million) [These studies complement other new and continuing PGI efforts supported through other accounts: \$10 million of Operations and Maintenance (O&M) funds will support peer-reviewed, extramural research concerning exposure to chemical warfare agents and other toxins, and possible health effects of combinations of inoculations and investigational new drugs; \$3.4 million of O&M funds will support development of an anti-bacterial treatment for PGI-affected veterans;

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- (U) \$2 million of O&M funds will continue efforts on troop location information, toxicology, mycoplasma, sleep disorders, and clinical data analyses; and \$2 million of Army research and development funds will continue PGI-related efforts (i.e leishmaniasis). Thus, DoD's total FY97 investment in PGI efforts is over \$27 million.]
- (U) Support completion of facilitization efforts enabling state-of-the art collaborative brain research. (\$6.45 million)
- (U) FY 1998 Plans: Not Applicable.
- (U) FY 1999 Plans: Not Applicable

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<u>(U) B. Program Change Summary</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>To Complete</u>	<u>Total Cost</u>
FY 1997 President's Budget	0	0	0	0	46.500	46.500
Appropriated Value:	25.000	21.500				
Adjustments to Appropriated Value:						
a. Congressionally-directed undistributed reduction	(1.717)	(.166)			(1.833)	(1.833)
b. Rescission/Below-threshold reprogramming:						
c. Other:						
Current Budget/FY - 1998/99 President's Budget:	23.283	21.334			44.617	44.617

Change Summary Explanation:

Funding: Changes are due to defense program adjustments.  
 Schedule: Not Applicable  
 Technical: Not Applicable

(U) C. Other Program Funding Summary Not Applicable.

(U) D. Schedule Profile Not Applicable.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3					R-1 ITEM NOMENCLATURE ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS PE 0603750D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE)	37.438	56.972	121.076	139.458	145.074	136.772	139.693	142.976	Continuing	Continuing
ACTDs/PS23	37.438	56.972	121.076	139.458	145.074	136.772	139.693	142.976	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

**(U) BRIEF DESCRIPTION OF ELEMENT:** The Department of Defense recognizes the need to stimulate innovation in new operational and organizational concepts, and in advanced technologies necessary to realize a "revolution in military affairs". The Advanced Concept Technology Demonstrations (ACTDs) are a low risk vehicle for integrating and evaluating the advanced technologies, unconventional operational concepts and new organizational structures needed to implement a revolution in military affairs. In addition to stimulating innovation, ACTDs provide two other significant opportunities. ACTDs provide experienced combat commanders with an opportunity to develop operational concepts that address military needs prior to major acquisition decision and large dollar commitments. They also provide the Services with an approach for compressing acquisition cycle time and for offering direct and immediate solutions to urgent theater needs. As such, they are at the foundation of the acquisition reform process.

**(U)** The demonstrations include the intimate involvement of an operational user, who establishes the military need, and the material development community, who brings the technology. Each ACTD arises in response to a serious deficiency in some military capability, as perceived and articulated by the operational warfighting community (Joint Chiefs of Staff (JCS), Unified Commander in Chiefs (CINCs), Service operational organizations). Technology maturity is assessed by Deputy Under of Defense for Advanced Technology (DUSD(AT)) with assistance of senior members of the science and technology community (known as the Breakfast Club). The approval process includes very

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active participation by the Joint Staff, the Joint Requirements Oversight Council (JROC), the CINCs and the Services. After a comprehensive review of the ACTD candidates by the Services and Unified Commands, the JROC makes a final recommendation, based on the urgency of the need and payback for the investment, of those ACTDs that should be initiated, to the Under Secretary of Defense (Acquisition & Technology) and the Vice Chairman of the JCS.

(U) Typically the operational manager of the ACTD is a Unified Commander, for instance United States Atlantic Command is the operational manager for nine active ACTDs. The demonstration manager is typically a service or agency developer, for instance Defense Advanced Research Projects Agency (DARPA) is the demonstration manager for Advanced Joint Planning. The emphasis in most ACTDs is on joint operations and integration of technologies from multiple service and agency laboratories.

(U) The typical timeline of two-to-four years for an ACTD is quite compressed compared to normal timelines for fielding an operational capability. These shorter schedules are made possible by a combination of factors. First, ACTDs incorporate mature or nearly mature technology and therefore forgo time consuming technology development and technical risk reduction activities. Second, ACTDs demonstrate the capability that is available with current technology and within allocated resources. At the end of the ACTD, the user is able to recommend that the capability provided by current technology has sufficient utility to warrant procurement; or, if there are significant shortcomings, either pursuing an advanced technology demonstration to improve performance or not pursuing the technology any further at this time. In cases where the operational user is satisfied that the prototype has significant utility, we can immediately provide him with the interim capability and then move quickly to enter the formal acquisition process and acquire quantities to fully satisfy the need.

(U) In keeping with this streamlined demonstration process is the ACTD philosophy to maintain a flexible approach to the management and oversight of ACTDs, and avoid excessive rigidity and formality in documentation and process. The principal management tool for the ACTD is the ACTD Management Plan. Each approved ACTD will be described in a top-level document that provides details of the demonstration/evaluation, the main objectives, approach, critical events, measures of success, transition options, participants, schedule, and funding.

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(U) Ten ACTDs were identified and initiated in FY 1995. Twelve additional candidates were planned for FY 1996 initiation but were reduced to nine as a result of funding cuts. The Low Life Cycle Cost Helicopter ACTD, planned for FY 1996, was accelerated due to ship schedules and completed in FY 1995. Three more ACTDs were added in FY 1996 after the initial approval process to address very urgent warfighting needs. As in the normal annual process, these three add-ons were all coordinated through the ACTD approval process described above. The three FY 1996 ACTD add-ons are the Tactical Unmanned Aerial Vehicle (UAV), Counter Sniper and Tactical High Energy Laser (THEL) ACTDs. Each of these ACTDs integrate existing technology programs and/or Advanced Technology Demonstrations (ATDs) to focus the ACTD on a specific and defined military need. A rigorous review, that included inputs from all the Combatant Commands and Services and a coordinated recommendation by the Joint Requirements Oversight Council (JROC), resulted in a list of 18 prioritized candidates for FY 1997 initiation. The ACTD initiative is in its third year. When the process is fully implemented by Office of the Secretary of Defense (OSD) and the Joint Staff we can expect to have ACTDs from at least four fiscal years in progress at any given moment.

(U) The process to identify the prioritized list of candidate ACTDs for FY 1998 start is on schedule for approval by the USD(A&T) by June 1997. In mid December 1996 the Joint Staff forwarded to DUSD(AT) the Unified Commanders and Joint Staff lists of areas reflecting military needs that these organizations recommended for ACTD projects. The needs were derived from CINC and Service priorities such as expressed in the Integrated Program Lists, Joint Vision 2010, and the Chairman's Program Analysis and Program Review issues, plus from documents such as the FY 1996 Defense Technology Area Plan and the FY 1996 Joint Warfighting Science & Technology Plan. In early February the DUSD(AT) forwarded an initial list of candidate ACTDs back to the Services, the Unified Commanders and the Joint Staff. This list reflected those candidates that the Breakfast Club assessed as having sufficient technology availability and maturity to address the needs identified. These candidate ACTDs will be reviewed and prioritized by the JROC and their recommendation will go to the Under Secretary of Defense for Acquisition & Technology (USD(A&T)) and the Vice Chairman of the JCS for approval. In each case, other sources provide most of the funding requirement of the ACTD. Additional funding, typically less than 17%, will be drawn from this Program Element to integrate the technologies together into a meaningful demonstration of military utility, to provide for extensive user participation and evaluation and to provide support for residual operational use.

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- (U) The funding of this PE will provide additional incremental funding for some but not all of those now being planned. New candidates are prioritized during the review process and initiated based on that prioritization and available resources. Details of the prioritized ACTD candidates are available upon request. Funding from this program element is used predominantly 1) to support actual demonstrations and exercises, 2) to provide multiple sets, where required, of hardware to demonstrate military utility, and 3) to fund residual operations and support for two years
- (U) The ACTD program is currently under Budget Activity 3 because these efforts focus on the development and integration of hardware/software for field evaluations and demonstrations. The result of the ACTD efforts is an integration of the demonstrated technological capabilities in addition to the development of concepts of operation by the forces. This leads to significantly improved understanding of the military utility and value of new technologies assessed within a realistic operational context prior to making acquisition decisions.
- (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**
- (U) **FY 1996 Accomplishments:** The remaining FY 1995 ACTDs were continued and FY 1996 ACTDs were started in addition to identifying and reviewing new ACTD candidates for FY 1997. (\$37.438 million) The ACTDs started in FY 1996 are: Airbase/Port Biological Defense, Battlefield Awareness and Data Dissemination, Combat Identification, Combat Vehicle Survivability, Counter Proliferation, Counter Sniper, Joint Logistics, Miniature Air Launched Decoy, Navigation Warfare, Semi-Automated IMINT Processing, Tactical High Energy Laser, and Tactical UAV. Cruise Missile Defense Phase I completed its demonstration in January with four very successful engagements of ship-launched air defense missiles directed solely by off board sensors developed as part of the ACTD against targets flying as low as 50 feet.



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(U) FY 1996 accomplishments to date include:

- The FY 1997 candidate ACTDs were prioritized by the JROC and USD(A&T) approved the prioritized list.
- Cruise Missile Defense Phase I completed very successful live fire demonstrations in Hawaii involving Aegis Cruisers with Standard Missiles and Patriot Missile units. Phase I resulted in the validation of the Air Directed Surface-to-Air Missile concept, which is a critical central element in attacking over-the-horizon low flying cruise missile targets. The data gathered in this ACTD is supporting development of the Medium Extended Air Defense System (MEADS), Patriot Advanced Capability (PAC) III, Standard Missile Block IV, the E-2C upgrade, and aerostat concepts. It is also being fed into the evolving Airborne Warning and Control System (AWACS) and Joint Surveillance Target Attack Radar System (Joint STARS) upgrade programs yet to be funded. This ACTD is complete.
- Air Base/Port Biological Detection ACTD: Modified Interim Biological Agent Detector (IBAD), to include integrated, automated agent identification capability, has been developed and underwent testing at Dugway Proving Ground in preparation for stress testing in FY 1997. Initiated on-site background sampling at Osan Air Base, Korea. IBAD represents significant enhancement in capability, detection, sensitivity, and time from detect to warn.
- The Battlefield Awareness and Data Dissemination (BADD) and Combat Identification ACTDs are preparing to deploy hardware to Task Force XXI in March 1997. Information management technologies developed through the BADD ACTD effort were deployed to Bosnia as part of the Bosnia Command and Control Augmentation.
- The Combat Identification ACTD has installed 68 Battlefield Combat Identification Systems on 4th Infantry Division vehicles at Fort Hood. Training for Task Force XXI has begun. A simulation and evaluation was successfully conducted showing the Digital Battlefield Applique providing identification data to a Bradley gunner through the weapon sight. Early comments from combat vehicle gunners are very favorable.
- The Combat Vehicle Survivability ACTD is a classified program. Information is available in separate channels for this program.
- Prototype planning tools from the Counterproliferation ACTD are currently being used in Bosnia. Seventeen tests of the hard target smart fuze have been conducted, 14 were successful. Engineering solutions were identified and implemented to resolve problems encountered in testing. A series of tests was completed in April against a surrogate biological weapons facility to test the effectiveness of new fuzes, sensors, planning tools and explosives.

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- The Counter Sniper equipment was acquired and tested successfully. Four separate technologies were evaluated by counter sniper teams from both the Army and the Marine Corps. One hardware set was successfully deployed in support the Olympics security activity, and will be returned to the Dismounted Battlespace Laboratory when evaluations by civilian law enforcement agencies are completed. This ACTD is completed.
- The ACTD Information Warfare Red Team was initiated to assess the different ACTD vulnerabilities to information warfare and to ensure adequate protective measures are taken. ACTDs being evaluated by the team include Advanced Joint Planning, Joint Countermine, Battlefield Awareness and Data Dissemination, Rapid Force Projection Initiative, Counter-Multiple Rocket Launcher. This is a continuing effort, with programs selected from each year's new starts.
- Technology development of advanced analysis and modeling programs under the Joint Logistics ACTD is ongoing at United States Atlantic Command (USACOM). The Joint Logistics system/network was deployed to Bosnia in November 1995 and is still supporting Operation "JOINT ENDEAVOR." The Logistics Anchor Desk operational assessment of the value added found that the baseline program added utility and represents a good start, but should be improved.
- The first prototype of the Joint Readiness Addition to the Advanced Joint Planning tool was delivered to USACOM and the Joint Staff in August 1996. Additional prototypes will be delivered to all participants in November 1996 and March 1997.
- Concept of Operations development began for the Miniature Air Launched Decoy.
- The Semi-Automated Imagery Processing system architecture was defined, hardware purchased and integrated, software development completed, software integration and testing completed, processing of Advanced Synthetic Aperture Radar System 2 (ASARS-2) data started, and system performance evaluation and tuning started.
- The Tactical Unmanned Aerial Vehicle contract was awarded. Alliant Techsystems' Outrider UAV was selected with first flight expected to occur in early FY 1997.
- Theater High Energy Laser ACTD was initiated with an agreement with Israel.
- In preparation for a potential Counter Camouflage, Concealment and Deception ACTD start in 1997, a Foliage Penetration Red Team conducted a series of trades to assess the maturity of various technologies. These trades covered frequency selection, antenna design, platform options, and C4I issues. Based on the results of these trades the Red Team recommended to USD(A&T) that this ACTD be deferred until the technologies mature sufficiently to enable a lower risk ACTD.

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### (U) Operational Planning and Military Utility Assessment activities:

- Advanced Joint Planning: Software tools to provide the Commander, USACOM with insight into readiness of component and to manage Time Phased Force Deployment Data (TPFDD) are in use on a daily basis. These tools (TPEdit and the Joint Readiness Assessment Management System (JRAMS)) were used to support force deployment to Joint Endeavor. The AJP tools are used on a daily basis. The tools are in the process of transitioning into the Global Command and Control System (GCCS) common operating environment (COE).
- The low observable High Altitude Endurance UAV (DarkStar) successfully completed its first flight. On the second flight the aircraft crashed shortly after takeoff. In response to the accident investigation board identified deficiencies, hardware modifications to Air Vehicle #2 are being implemented, and software changes are being investigated.
- The conventional High Altitude Endurance UAV (Global Hawk) is being assembled and is on track for roll-out and first flight at Edwards Air Force Base, California. Work continued on writing and coordinating the joint concept of operations.
- The Medium Altitude Endurance UAV (Predator) is presently being successfully employed in Bosnia in support of all peace keeping forces. United States Atlantic Command led a user team to complete work on the initial version of the joint concept of operations. A report on the military utility of the Predator system was published documenting the results of the tests and deployments. This ACTD is complete and operational lead transitioned to the Air Force's 11th Reconnaissance Squadron in September 1996. The Predator UAV transitioned from an ACTD to a User operated system and acquisition program. This ACTD is complete.
- Precision SIGINT Targeting System is planning two exercise combining both national and tactical sensors to geolocate targets.
- Synthetic Theater of War - 97 (STOW 97) has been the impetus behind a Memorandum of Agreement with the United Kingdom (UK) for cooperation on all ACTDs as appropriate. The Department has also negotiated a project agreement with the UK, to participate in the November 1997 USACOM exercise and for technology exchange. This is the first step to making STOW technology an international standard.

- (U) FY 1996 funds were transferred to the executing Service/Agency on approval of the ACTD plans. (\*\$7.438 million)

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(U) **FY 1997 Plans:** The ACTDs initiated in FY 1995 and FY 1996 that have not been completed will continue. The ACTDs that have been successfully demonstrated will continue to be transitioned to the User organization(s).

(U) The 18 candidates, in prioritized order, for FY 1997 include: Rapid Terrain Visualization; Information Warfare Planning Tool; Counter Camouflage, Concealment and Deception; Military Operations in Urban Terrain; Counterproliferation Phase II; Cruise Missile Defense, Phase II; Extending the Littoral Battlespace; Chemical Enhancement to Biological Detection ACTD; Secure Personal Communications (Cell Phone); Unattended Ground-Based Sensors; Integrated Collection Management; Multimission Advanced Ground Intelligent Control; Precision Targeting Engagement; Global Grid Tactical Fiber; Wide Area Tracking System; Survivable Armed Recon on the Digital Battlefield; Joint Advanced Health and Usage Monitoring System (for helicopters); and Ground based Electro-optical Deep Space Surveillance Upgrade Prototype System (GUPS). Rapid Battlefield Visualization has been changed to Rapid Terrain Visualization to more clearly catch the purpose of the ACTD. Sea Dragon has been changed to "Extending the Littoral Battlespace" to differentiate the ACTD from the Marine Corps Commandant's warfighting laboratory also known as Sea Dragon and to more accurately reflect the joint nature of the ACTD. The \$40 million reduction from the amount requested in FY 1997 means that only three FY 1997 candidates of the 18 prioritized and recommended by the JROC will be started. These three candidates were judged by the JROC to have the highest priority based on need, military utility, and payback. The three new starts are Rapid Terrain Visualization, Information Warfare, and Military Operations in Urban Terrain. They will be initiated with the available FY 1997 funds from this program element. The Extending the Littoral Battlespace program will start without funds from this PE, and other candidates, Chemical Enhancement to Biological Detection, Integrated Collection Management, and Wide Area Tracking System, will be funded latter if funds become available.

(U) Continue the process identified and outlined above to identify FY 1998 ACTD candidates. Candidates have been received from the Unified Commands, the Services, and Defense agencies. The candidates cover a broad range of technologies and needs including information warfare, weapons and munitions, logistics, intelligence, reconnaissance, medicine, and information technology. These candidates are being evaluated for technology maturity by the Breakfast Club and for operational need and utility by the Joint Staff JWCA process. The Joint Requirements Oversight Council will then review and prioritize the candidates.

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(U) Other significant plans for FY 1997 are:

- The Advanced Joint Planning ACTD will continue demonstrations at USACOM and complete transition of its first software products. The map based planning software tool was delivered on December 31, 1996 for development and assessment by USACOM.
- Joint Countermine will have its first operational demonstration in August 1997 under the sponsorship of USACOM.. The British formally petitioned to participate in the ACTD in early January 1997. Elements of the Joint Countermine demonstration will be considered for transition.
- The Synthetic Theater of War-97 will conduct its major demonstration with the United Kingdom as a major participant.
- The Airbase/Port Biological Detection ACTD will conduct both stateside and overseas demonstrations. The array of internetted detectors with complete connectivity will be deployed to Osan Airbase, South Korea in November 1997. Background sampling will be initiated in the Central Command (CENTCOM) Area of Responsibility.
- The technologies and concepts of operation for the Battlefield Awareness and Data Dissemination will be evaluated in the Army Force XXI demonstrations and the Marine Corps Hunter Warrior exercise.
- The Combat ID ACTD will execute its three major field events; Task Force XXI at Fort Irwin, California, All Service Combat Identification Evaluation Team at Camp Shelby Mississippi, and an International Demonstration in Germany.
- The Combat Vehicle Survivability ACTD is a classified program. Information is available in separate channels for this program.
- Counterproliferation will conduct a series of integration, test and demonstration activities against surrogate chemical production facilities. There was a successful end-to-end integrated demonstration of fuzes, sensors, targeting and hazard prediction tools in December 1996, with live ordnance dropped from am F-15E against a simulated biological weapons facility.
- The Miniature Air Launched Decoy (MALD) contract was awarded to Teledyne-Ryan Aeronautical on 5 November 1996. The 30-month ACTD will conduct demonstrations on confusing enemy air defenses by simulating attacking aircraft, greatly enhancing combat aircraft survivability.
- The Navigation Warfare ACTD will start demonstrating and evaluating systems designed to protect the use of Global Positioning System (GPS) in a hostile environment. The users will complete Concept of Operations (CONOPS) development and begin refinement of the CONOPS based on exercise results. They will complete identification of operating parameters and critical scenarios. Delivery of equipment constituting residual assets will begin.

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- The Semi-Automated Imagery Processing ACTD will start demonstrations and evaluations of tools designed to greatly decrease the time needed to exploit imagery beginning with participation in Operation Desert Capture in March 1997.
  - In the Theater High Energy Laser ACTD subsystem integration will start in late FY 1997. This is a joint ACTD with Israel.
  - Information Warfare Planning Tool development will begin. The operational user lead by the Air Force Air Intelligence Agency operational manager will begin planning for demonstrations, and establishing the measures of effectiveness for military utility assessment.
  - Operational users work with developers to begin defining and integrating Service/Agency Military Operations in Urban Terrain (MOUT) programs and preparing concepts of operations. Begin planning for exercises and demonstrations for MOUT integration experiments in following years. Support work installing simulation experiment test bed capability at Fort Benning, Georgia and Camp Lejeune, North Carolina.
- (U) Operational Planning and Military Utility Assessment activities:
- Both High Altitude UAVs will conduct flight testing. The US Atlantic Command operational user will continue CONOP refinement and prepare for operational assessment of the systems.
  - Precision Rapid Counter-Multiple Rocket Launch completed its operational demonstration and evaluation in October 1996 and is being turned over to the 2nd Infantry Division in Korea. This ACTD is complete.
  - Precision SIGINT Targeting System conducted its fourth in a series of six planned demonstrations in conjunction with Exercise Foal Eagle in Korea on October 28-November 8, 1996. National and tactical SIGINT sensors conducted coordinated collections against a set of threat emitter simulators. Numerous geo-locations were obtained within the precision goals. Excellent progress was made in timeliness.
  - Support exercises and utility assessment for Rapid Force Projection Initiative.
  - The Tactical UAV ACTD will start flight tests and limited user evaluations.
- (U) FY 1997 funds for new ACTD initiatives and to continue FY 1995 and 1996 ACTDs will be transferred to the executing Service/Agency. (\$56.972 Million).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		Date: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3	R-1 ITEM NOMENCLATURE ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS PE 0603750D	

(U) **FY 1998 Plans:** Transition those ACTDs that have successfully demonstrated military utility. Continue three of the FY 1995 ACTDs, nine of the FY 1996 ACTDs, and three of the currently funded FY 1997 ACTDs towards demonstration and transition. Continue the annual process of identifying ACTDs that rapidly address user needs. DUSD(AT) is coordinating with the Joint Staffs Joint Warfighting Center to identify candidate ACTDs that could support and help implementation of the Chairman of the Joint Chiefs Joint Vision 2010. Start user demonstrations for those ACTDs initiated in FY 1997. Funding will continue for those ACTDs initiated in FY 1995, 1996, and 1997 (\$59.858 million total for all prior year ACTDs) that have not been completed or transitioned to acquisition programs. Funding available for initiating new FY 1998 ACTDs, after subtracting for previous years ACTDs, will be approximately \$61.218 Million. (\$121.076 Million).

(U) Other significant plans for FY 1998 are:

- The Advanced Joint Planning ACTD is scheduled to complete in November 1997.
- Joint Countermine ACTD will conduct Demonstration II. The Navy will lead the demonstration which will emphasize clandestine surveillance and reconnaissance technologies and seamless transition of countermine operations from the sea to the land.
- Air Base/Port Biological Detection ACTD will conduct user evaluations at Osan Air Base, Korea and in the CENTCOM Area of Responsibility.
- Continue operational assessments of and support for BADD elements and refinement of CONOPS. Prepare for future demonstrations of the technologies.
- Combat Identification "leave behind" assets will be supported for continued operation and to obtain additional user feedback on military utility and maintainability. This commitment to continued operational support provides a mechanism by which critical features for the continued development of Combat Identification technologies are identified.
- The Combat Vehicle Survivability ACTD is a classified program. Information is available in separate channels for this program.
- Counterproliferation ACTD activities will focus on supporting residual assets for further operational feedback to assist system engineering & integration and production activities.
- The Information Warfare Red team will continue evaluation of the vulnerability of selected ongoing and new start ACTDs to information warfare.
- The MALD program will conduct flight demonstrations and operational users will evaluate military utility in preparation for the user assessment and recommendation..

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		Date: February 1997
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- The Navigation Warfare team will continue to refine the CONOPS based on exercise results. Additional hardware will be delivered for testing and demonstration and will later become residual assets.
  - Semi-Automated IMINT Processing integration and field testing will continue to achieve transition system objectives and to support U-2 Advanced Synthetic Aperture Radar System (ASARS-2), and the ASARS-2 Improvement Program. Military utility assessment by the operational customer, USACOM, will begin.
  - Rapid Terrain Visualization (RTV) users will refine operational concepts, plan and conduct demonstrations leading to satisfaction of initial set of operational needs.
  - Information Warfare Planning Tool development and user evaluation preparation will continue. Field testing of the tool set will begin.
  - Continue planning for MOUT integration experiments and conduct initial experiments. Refine operational concepts based on experience gained in experiments. Support procurement of residual equipment and continued implementation of the simulation experiments test beds at Fort Benning, Georgia and Camp Lejeune, North Carolina.
- (U) Operational Planning and Military Utility Assessment activities:
- Theater High Altitude Laser system integration will be completed and system testing at the Capistrano test site will begin.
  - Continue user evaluations of Global Hawk and Darkstar HAEs.
  - Support user exercises and demonstrations of the military utility of the Tactical Unmanned Aerial Vehicle.
  - Continue RFPI operational scenario development for planned FY 1998-9 exercises, and military utility evaluation of the technologies.
  - Funds user planning, CONOPS development and residual support activities supporting ACTDs.



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## RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

Date: February 1997	
R-1 ITEM NOMENCLATURE ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS PE 0603750D	APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3

(U) **FY 1999 Plans:** Continue the process of transitioning and initiating ACTDs. Numerous demonstrations will be conducted for those ACTDs initiated in previous years. All FY 1995 ACTD demonstrations should be completed during this period along with most of the FY 1996 and 1997 ACTDs. All other available funds will be used to continue ACTDs initiated in previous years. (\$139.458million)

(U) Other significant plans for FY 1999 are:

- The Joint Countermine ACTD will provide follow-on analysis and support for the residual equipment.
- Air Base/Port Biological Detection residual assets will be supported and users will continue evaluations of the military utility of the systems.
- Continue operational assessments of and support for BADD elements and refinement of CONOPS. Prepare for future demonstrations of the technologies.
- Combat Identification "leave behind" assets will be supported for a last year of continued operation and to obtain additional user feedback on military utility and maintainability. This commitment to continued operational support provides a mechanism by which critical features for the continued development of Combat Identification technologies are identified.
- Counterproliferation ACTD activities will focus on supporting residual assets for further operational feedback to assist system engineering & integration and production activities.
- The Information Warfare Red team will continue evaluation of the vulnerability of selected ongoing and new start ACTDs to information warfare.
- The Navigation Warfare ACTD will complete its evaluation. Support will continue for residual assets to be used in exercises and demonstrations.
- The USACOM operational assessment of the utility of the SAIP processes will begin. Final transition configuration of the system will be stood up and all software upgrades will be demonstrated.
- RTV activities include development of operational procedures and techniques for use of high resolution digital terrain data leading to satisfaction of the next level of operational needs.
- Information Warfare Planning Tool ACTD will continue development of tools and preparation for operational evaluations. Field testing and data evaluation will continue and field demonstrations will be conducted.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3	R-1 ITEM NOMENCLATURE ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS PE 0603750D	

- (U) Operational Planning and Military Utility Assessment activities:
- Continue user evaluations of Global Hawk and Darkstar HAEs.
  - Continue RFPI operational scenario development for planned exercises, and military utility evaluation of the technologies.
  - Funds user planning, CONOPS development and residual support activities supporting ACTDs.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		Date: February 1997
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(U) Acquisition strategy. Not Applicable

(U) B. Program Change Summary	FY 1996	FY 1997	FY 1998	FY 1999	To Complete	Total Cost
Previous President's Budget	37.087	98.471	127.478	140.111	Continuing	Continuing
Appropriated Value		58.471				
Adjustments to Appropriated Value						
a. General reductions	(1.649)	(1.499)	0			
b. Below-threshold reprogramming	2.000		0			
c. Other	0	0	(6.402)	(.653)		
Current Budget Submit/President's Budget	37.438	56.972	121.076	139.458	Continuing	Continuing

Change Summary Explanation: (total Program Element or Project, as applicable).

FY 1996: Decreases - Bosnia reprogramming reduction (\$0.731), reduction for Lincoln Labs (\$0.459), and general reductions (\$1.190).

Increase: Reprogramming action was in support of Cruise Missile Defense (\$2.000).

FY 1997: Decrease in funding the result of Congressional and general reductions.

Schedule: (total Program Element or Project, as applicable) Not Applicable

Technical: (total Program Element or Project, as applicable) Not Applicable

(U) C. Other Program Funding Summary Cost: Not Applicable

(U) D. Schedule Profile: Not Applicable

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		Date: February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3	R-1 ITEM NOMENCLATURE ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS PE 0603750D	

**(U) E. PE Funding for FY 95 ACTDs:**

<u>ACTD</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>
Advanced Joint Planning	0	0	0	0
Cruise Missile Defense Phase I*	2.244	0	0	0
Joint Countermine	0	1.050	3.100	1.200
High Altitude Endurance UAV	0	0	0	0
Kinetic Energy Boost Phase Intercept*	0	0	0	0
Medium Altitude Endurance UAV*	0	0	0	0
Precision SIGINT Targeting System	0	0	0	0
Rapid/Counter Multiple Launcher*	0	0	0	0
Rapid Force Projection Initiative	0	0	0	0
Synthetic Theater of War	0	4.000	2.000	2.000

\* Completed

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ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS  
PE 0603750D

## (U) E. PE Funding for FY 96 ACTDs

ACTD	FY 1996	FY 1997	FY 1998	FY 1999
Airbase/Port Biological Detection	1.817	2.793	1.000	2.000
Battlefield Awareness and Data Dissemination	1.050	4.000	4.000	2.000
Combat Identification	17.459	15.268	4.000	4.000
Combat Vehicle Survivability	1.217	2.440	1.133	0
Counterproliferation	.455	1.650	1.025	4.400
Counter Sniper	0	0	0	0
Foliage Penetration Red Team	.085	0	0	0
Information Warfare Red Team	.950	1.821	3.000	3.000
Joint Logistics	.750	0	0	0
Joint Readiness Addition to Advanced Joint Planning	1.500	3.600	0	0
Low Life Cycle Cost, Medium Lift Helicopter*	0	0	0	0
Miniature Air Launched Decoy	.500	4.000	.700	0
Navigation Warfare	6.669	4.500	3.900	.300
Operational Planning and Military Utility Assessment	.744	1.200	2.000	2.000
Semi-Automated IMINT Processing	1.998	4.000	2.000	2.000
Tactical UAV	0	0	0	0
Theater High Energy Laser	0	0	0	0

\*Completed in FY 95.

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**(U) E. Estimated PE Funding for FY 97 ACTD Candidates**

<u>ACTD</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>
Rapid Terrain Visualization	0	0	1,500	2,000
Information Warfare Planning Tool	0	2,250	2,000	1,500
Counter Camouflage, Concealment and Deception	0	0	0	4,000
Military Operations in Urban Terrain	0	1,200	15,100	11,900
Counterproliferation Phase II	0	0	0	5,000
Extending the Littoral Battlespace	0	0	2,000	5,000
Chemical Enhancement to Biological Detection	0	*0	1,000	.500
Secure Personal Communications (Cell Phone)	0	*0	0	0
Unattended Ground Based Sensors	0	0	2,900	2,800
Integrated Collection Management	0	*0	1,000	1,000
Multi-mission Advanced Ground Intelligent Control	0	*0	0	0
Precision Targeting Engagement	0	*0	0	0
Global Grid Tactical Fiber	0	*0	0	0
Wide Area Tracking System	0	*0	.300	.300
Joint Advanced Health and Usage Monitoring System	0	0	6,200	5,400
GEODSS Upgrade System	0	*0	0	0
Application in Evolving International Security Environment		.200	0	0
Near Shore Tactical Reconnaissance		3,000		

\* Deferred due to Congressional Cuts. Will be considered with FY 1998 candidates.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3		R-1 ITEM NOMENCLATURE COMMERCIAL TECHNOLOGY INSERTION PROGRAM PE 0603752D								
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Commercial Technology Insertion Program	0	9.744	45.889	47.457	47.033	46.619	47.615	48.734	Continuing	Continuing
P*795 - Commercial Technology Insertion for First Use Military Applications	0	9.744	26.641	29.457	29.033	36.619	43.615	44.734	Continuing	Continuing
P*796 - Open Systems Demonstrations to Expand Commercial Insertion Opportunities	0	0	19.248	18.000	18.000	10.000	4.000	4.000	Continuing	Continuing

(U) **A. Mission Description and Budget Item Justification**

(U) **BRIEF DESCRIPTION OF ELEMENT:** The purpose of the Commercial Technology Insertion Program (CTIP) is to reduce risks and increase opportunities for insertion of commercial technologies into defense systems. By supporting the required nonrecurring engineering, test and qualification, CTIP enables commercial components to be used confidently in weapon system applications. By demonstrating open system architectures for use of the latest commercial technology, CTIP increases the ability of defense systems to avoid parts obsolescence and keep pace with commercial technology advancement. Commercial technologies selected for insertion through this Program apply to more than one weapon system and will reduce life cycle costs and improve performance, reliability and maintainability. This Program is essential to implementing the Department's strategy for increased reliance on the commercial sector for technologies important for national defense.

(U) The Program is managed by the Office of the Deputy Under Secretary of Defense (International and Commercial Programs) (DUSD(I&CP)), and executed by Service program offices. Proposed projects for the insertion of commercial technologies and demonstration of open architectures in defense systems are selected by the Services and approved for funding by the DUSD(I&CP). The systems selected as initial applications are planned/ongoing development, and modification programs that are unwilling or unable to be first military users of commercial technology without CTIP risk reduction. This distinguishes CTIP from the Dual Use Applications Program - Commercial Operations and Support (O&S) Savings Initiative, whose purpose is to prototype new business approaches to generating O&S cost saving ideas for retrofit of fielded systems. CTIP has defined two major thrust areas for the FY 97-99 program: P\*795 -

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3	R-1 ITEM NOMENCLATURE COMMERCIAL TECHNOLOGY INSERTION PROGRAM PE 0603752D	

Commercial Technology Insertion for First Use Military Applications and P\*796 - Open Systems Demonstrations to Expand Commercial Insertion Opportunities.

(U) P\*795-The first thrust eliminates barriers to the insertion of a commercial component in a military system. DoD program managers are reluctant to take the risk of using parts whose characteristics in a military operating environment have not been tested. The business case often does not exist for a single program to make the required investment in adapting and testing commercial items. As a result military unique items continue to be selected by designers of defense systems, leading to higher costs, lower reliability, increased parts obsolescence, and often lower performance than commercial alternatives. CTIP addresses this problem by providing the engineering and qualification testing needed for the "first user" program, thereby reducing the risk and expense to an acceptable level for follow-on programs. CTIP also develops systems to provide information to users on test and operational experience with commercial parts in military applications. Two projects were initiated in the first year of the program: (1) air bag actuator technology for fuze, safe, and arm devices, with initial applications for undersea weaponry and missiles, and (2) commercial analog to digital signal processing for the F-15 radar.

(U) P\*796-The second thrust focuses on the system engineering of open system architectures based on commercial market developments and trends, and on demonstrating the effectiveness and suitability of these open architectures for use in weapon systems. The purpose is to increase the opportunity for insertion of commercial subsystems and components from sources other than the original equipment manufacturer, and to facilitate upgrades over the life cycle to keep pace with commercial technology advancement. Defense system architectures are often proprietary system solutions that make parts substitution and future upgrades difficult. By contrast, the best practice in the commercial sector is to rely on open system standard interfaces that make upgrading faster, easier and less expensive. Commercial interfaces apply to computer hardware and software and to other electronic, electrical and mechanical attributes. The CTIP open system architecture initiative will demonstrate open system architecture solutions to expand commercial insertion opportunities on weapon systems such as the AV-8B and the Light Airborne Multipurpose System.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1996 Accomplishments:

(U) Not applicable. (Program starts in FY 1997) .

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3					R-1 ITEM NOMENCLATURE COMMERCIAL TECHNOLOGY INSERTION PROGRAM PE 0603752D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
P*795 - Commercial Technology Insertion for First Use Military Applications	0	9.744	26.641	29.457	29.033	36.619	43.615	44.734	Continuing	Continuing

(U) FY 1997 Plans:

(U) P\*795: Commercial Technology Insertion for First Use Military Applications

(U) Test, evaluate, and qualify commercial micro-electromechanical systems (MEMS) sensors for miniaturized fuze, safe and arm devices in Submarine Torpedo Defense, M57 Destructor, submunitions and the MPIM/SRAW missile guidance system. (\$4.4 million)

(U) Initiate system engineering to replace six circuit cards in the F-15 radar with two circuit cards employing commercial analog to digital technology. (\$4.3 million)

(U) Modify commercial simulation technology and qualify it for the Weapon System Engagement Trainer. (\$1.0 million)

(U) FY 1998 Plans:

P\*795: Commercial Technology Insertion for First Use Military Applications

(U) Expand testing and qualification of commercial MEMS sensors for application to Extended Range Guided Munition (ERGM) and land mines. (\$5.0 million)

(U) Complete system engineering on F-15 radar commercial technology. Design, prototype, and test the video processor board, integrate it with the digital signal processor board, and conduct bench testing to verify performance of commercial architecture and parts. (\$5.3 million)

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- (U) Develop a physics of failure model and reliable accelerated storage life testing to qualify Plastic Encapsulated Microcircuits (PEMs) for use in Hellfire and other missile systems. (\$3.3 million)
- (U) Perform system engineering to integrate commercial microelectronic components for use in the multichip modules for SADARM. Integrate suitable commercially available devices into multichip modules and screen to verify performance characteristics. (\$5.0 million)
- (U) Initiate commercial component qualifications and develop systems for information dissemination in additional commercial component categories and first use applications identified by the Services. (\$8.0 million)
- (U) FY 1999 Plans:
- (U) P\*795: Commercial Technology Insertion for First Use Military Applications
- (U) Expand testing and qualification of commercial MEMs devices for systems such as the Navy Half Length Hybrid Torpedoes, Army Wide Area Munition, and Air Force submunitions fuze, safe, and arm devices. (\$5.0 million)
- (U) Complete system level testing of the F-15 radar to qualify the commercial architecture and components for operational use. (\$4.5 million)
- (U) Conduct accelerated life testing of circuit cards using PEMs for Hellfire II, Longbow Hellfire, and the Longbow Hellfire Launcher. (\$7.5 million)
- (U) Prototype, test, and qualify circuit card assemblies using multichip modules and commercial microelectronic components for use in the SADARM. (\$8.4 million)
- (U) Continue component qualifications and implement the information dissemination system. (\$4.0 million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3					R-1 ITEM NOMENCLATURE COMMERCIAL TECHNOLOGY INSERTION PROGRAM PE 0603752D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
P*796 - Open Systems Demonstrations to Expand Commercial Insertion Opportunities	0	0	19,248	18,000	18,000	10,000	4,000	4,000	Continuing	Continuing

(U) FY 1997 Plans:

(U) P\*796: Open Systems Demonstration to Expand Commercial Insertion Opportunities

(U) Not applicable. Open Systems Architecture projects begin in FY 1998.

(U) FY 1998 Plans:

(U) P\*796: Open Systems Demonstration to Expand Commercial Insertion Opportunities

(U) Demonstrate the feasibility of standard commercial interfaces in the avionics suite, mission computer, and warfare management computer of the AV-8B. (\$10.2 million)

(U) Redesign existing interfaces and demonstrate that commercial network and Input/Output driver standards can be used in the Light Airborne Multi - Purpose System. (\$6.0 million)

(U) Initiate additional demonstrations of electrical and electronic system interfaces that allow an open system architecture approach to be applied to military systems identified by the Services in military equipment. (\$3.0 million)

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- (U) FY 1999 Plans:
- (U) P\*796: Open Systems Demonstrations to Expand Commercial Insertion Opportunities
- (U) Complete software development, and the establishment of interface standards for the AV-8B. Initiate system level testing. (\$1.8 million)
- (U) Complete redesign of interfaces, integration and test of commercial electronics in the Light Airborne Multi Purpose System. (\$7.0 million)
- (U) Continue demonstrations of electrical and electronic open system architectures and standard interfaces started in FY 1998. (\$9.2 million)

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<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-wide/BA 3	<b>R-1 ITEM NOMENCLATURE</b> COMMERCIAL TECHNOLOGY INSERTION PROGRAM PE 0603752D	

<b>(U) B. Program Change Summary</b>	<b>FY1996</b>	<b>FY1997</b>	<b>FY1998</b>	<b>FY1999</b>	<b>To Complete</b>	<b>Total Cost</b>
Previous President's Budget	0	48.411	48.048	47.679	Continuing	Continuing
Appropriated Value	0	10.000				
Adjustments to Appropriated Value						
a. Congressionally-directed undistributed reduction		(.256)				
b. Below threshold reprogramming						
c. Other			(.159)	(.222)		
Current Budget Submit/President's Budget	0	9.744	45.889	47.457	Continuing	Continuing

Change Summary Explanation:

Funding: Reductions due to Congressional adjustments for first year.

Schedule: Not Applicable

Technical: Not Applicable

(U) C. Other Program Funding Summary Cost: Not applicable

(U) D. Schedule Profile: Not Applicable

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APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE								
RDT&E, Defense-wide/BA 3		HIGH PERFORMANCE COMPUTING MODERNIZATION PE 0603755D								
COST ( <i>In Millions</i> )	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	111.620	122.900	126.211	148.852	155.902	163.757	157.006	162.767	Continuing	Continuing
Project Name/No. and Subtotal Cost HPCM/P507	111.620	122.900	126.211	148.852	155.902	163.757	157.006	162.767	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) **BRIEF DESCRIPTION OF ELEMENT:** The Department of Defense (DoD) High Performance Computing (HPC) Modernization Program (HPCMP) will allow the U.S. to maintain and extend its technological advantage in warfighting systems by providing for the HPC requirements of the science and technology (S&T) and developmental test and evaluation (DT&E) programs. HPC has been identified as a key enabling technology essential to achieving the objectives of DoD's S&T and DT&E programs. The DoD intends to support its missions by exploiting the improvements in computational and communications capabilities which result from advancements in hardware, architectural designs, software, networking, and computational methods. The HPCMP involves establishing and supporting environments at a few consolidated shared resources centers, available to all the DoD S&T and DT&E laboratories and centers, accessible to local and remote scientists and engineers via high-speed networks. Providing for the adaptation of broadband, widely-used scalable applications and algorithms to address growing S&T and DT&E requirements, along with continued training of users as new system designs and concepts evolve, is an integral part of the program. The program pursues continuous interaction with the national HPC infrastructure, including academe, industry, and other government agencies to facilitate the sharing of knowledge, tools, and expertise.

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(U) The HPCMP user base includes almost 3,000 computational scientists and engineers and approximately 50 DoD laboratories and over 1,200 computational scientists, engineers, and analysts at approximately 20 developmental test and evaluation facilities. The integrated HPCMP program consists of a set of four large Major Shared Resources Centers (MSRCs) that are responsible for as large a fraction of DoD's S&T and DT&E computational workload is feasible. These MSRCs provide extensive capabilities to address user requirements for hardware, software, programming environments, and training. A limited set of smaller shared resource centers, Distributed Centers (DCs), augment the MSRCs to form the total HPCMP computational capability. Distributed Centers address critical HPC requirements that cannot be met at MSRCs, such as real-time, and near real-time requirements, and leverage significant HPC expertise located at the remote sites. The MSRCs and DCs are currently interconnected with all S&T and DT&E user sites via the Interim Defense Research and Engineering Network (IDREN) and soon will be interconnected under the DREN Intersite Services Contract (DISC). The fourth component of the HPCMP is the Common HPC Software Support Initiative (CHSSI). CHSSI efforts will develop a set of critical common DoD applications programs that run efficiently on advanced HPC systems at the MSRCs and Distributed Centers.

(U) True modernization of DoD's HPC capability and fulfillment of the program's vision and goals requires a program strategy that addresses all aspects of HPC. While advancing the level of hardware performance is critical to success, the higher objective is to enable better scientific research and technology development for superior weapons, warfighting and related support systems. The goals of the HPCMP are to:

- Provide the best of commercially available, state-of-the-art HPC capacity and capability to enable weapons development and more capable warfighting systems.
- Ensure development of software tools, supportive programming environments, and applications to exploit the capabilities of HPC.
- Expand and train the DoD HPC user base to more effectively use HPC.
- Provide classified and unclassified access through robust high speed networking.
- Engage, leverage, contribute to, and be a major participant in the National HPC Infrastructure and exploit benefits for Defense R&D.



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APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE HIGH PERFORMANCE COMPUTING MODERNIZATION PE 0603755D	
RDT&E, Defense-wide/BA 3		

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1996 Accomplishments:

(U) The High Performance Computing Modernization Plan has been updated (draft) to include the DT&E mission that was added to the scope of the program in the FY 1995 Defense Appropriations Act, and the Ballistic Missile Defense (BMD) S&T DT&E support that was added to the scope of the Program in FY 1996. The HPC Requirements Analysis was updated to reflect changes in the S&T and DT&E requirements. Site visits were made to the Space and Strategic Defense Command (SSDC) and the Joint National Test Facility (JNTF) to assess BMD S&T and DT&E HPC requirements.

(U) MSRC Contracts: Four major contracts to support each of the MSRCs were competitively awarded during FY 1996. These contracts provide equipment for up to five years and comprehensive support services for the next five to eight years. The four MSRCs and their location are:

- Aeronautical Systems Center (ASC), Wright-Patterson Air Force Base, OH
- Army Corps of Engineers Waterways Experiment Station (CEWES), Vicksburg, MS
- Army Research Laboratory (ARL), Aberdeen Proving Ground, MD
- Naval Oceanographic Office (NAVO), Stennis Space Center, MS

(U) Nichols Research Corporation of Huntsville, AL was awarded contracts to support both the ASC and CEWES MSRCs. Grumman Data Systems of Herndon, VA was awarded the contract to support the NAVO MSRC. Finally, Raytheon E-Systems of Garland, TX was awarded the contract to support the ARL MSRC. Each of the MSRC contracts contains provisions, i.e. established contract options, to allow significant expansion of high performance computing systems and related support systems over the first five years of the contract. These contract options ensure that MSRC system expansions can take place in a timely fashion during each fiscal year.

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(U) Distributed Center Update: There are currently 12 distributed centers. In FY 1996 three existing centers were upgraded and three new centers were created. The distributed centers and their locations are listed below:

- Arnold Engineering Development Center (AEDC), Arnold AFB, TN
- Air Force Development Test Center (AFDTC), Eglin AFB, FL
- Army High Performance Computing Research Center (AHPCRC), Minneapolis, MN
- Maui High Performance Computing Center (MHPCC), Maui, HI
- Naval Air Warfare Center (NAWC), Patuxent River NAS, MD
- Naval Command, Control and Ocean Surveillance Center (NCCOSC), San Diego, CA
- Naval Research Laboratory (NRL), Washington, DC
- Naval Undersea Warfare Center (NUWC), Newport, RI
- Rome Laboratory (RL), Rome, NY
- Space and Strategic Defense Command (SSDC), Huntsville, AL
- Tank-Automotive Research, Development and Engineering Center (TARDEC), Warren, MI
- White Sands Missile Range (WSMR), NM

(U) In addition to the distributed centers listed above, the Arctic Region Supercomputer Center (ARSC) has been funded by Congress in FY1996 and FY1997 and is providing computational resources to the HPCMP user community.

(U) New Systems and Upgrades: Per FY 1996 Congressional direction, a BMD site (U.S. Army's Space & Strategic Defense Command (SSDC)) was established as a DC. Congress specifically appropriated FY 1996 RDT&E funds to support the BMD upgrade. New system and upgrades are normally funded with procurement funds. Hence, the "new systems and upgrade" category funded with RDT&E in FY 1996, is not carried forward into FY 1997, FY 1998 or FY 1999. (\$27.870 million)

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(U) Networking: A competitive acquisition contract to provide for network services with increased bandwidth performance the Defense Research and Engineering Network (DREN) Intersite Services Contract (DISC) was awarded to AT&T in the 4th quarter of FY 1996. This service will replace the dedicated leased line system that makes up the existing Interim Defense Research and Engineering Network (IDREN). In the meantime, the IDREN will be sustained until all of the HPCM network connections can be transitioned to DISC. (\$16.168 million)

(U) Software Applications Support: FY 1996 marks the first year of the CHSSI effort, which provides support for the development of new applications software and the conversion of existing applications software and algorithms to proven higher performance systems. Funding provided in FY 1996 supported efforts starting in mid-year. (\$8.925 million)

(U) MSRC and Distributed Center Sustainment: The program continued to sustain and support the integration, operation and use of existing HPC resources at the two large MSRCs and two smaller MSRCs. The program funded maintenance expenses for the HPC systems at the DCs. The program funded sustainment and operations at the MHPCC and the ARSC in accordance with FY 1996 Congressional language. Although not formally a HPCMP DC because it lacks a DoD sponsor, ARSC funding is included in the DC totals. (\$50.274 million total=MSRCs \$31.105 million + DCs \$19.169 million)

(U) Program Management and Administration: This element includes the functions of overall program management, planning and direction, and support of program management office personnel and facilities, throughout the Program's lifecycle. It also includes temporary acquisition management functions such as preparation and release of requests for proposal, the evaluation of proposals received and the award of the four MSRC contracts and the DISC contract, which were significant in FY 1996. (\$8.303 million)

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(U)	FY 1996 RDT&E funds are allocated as follows:	(\$ Millions)
	New HPC Systems & Upgrades	27.870
	Networking	16.168
	Software Applications Support	8.925
	MSRC and Distributed Center Sustainment	50.274
	Program Management & Administration	8.383
	TOTAL	111.620

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(U) FY 1997 Plans:

(U) Shared Resource Centers: The program will continue the modernization and sustainment of the Shared Resource Centers. Additional HPC systems, storage, and scientific visualization capabilities will be acquired to populate and upgrade the established MSRCs to fulfill the projected and growing HPC requirements of the laboratories and R&D centers. Contract options will be executed to upgrade performance at three MSRCs, minimally tripling their computing capability over the two year period (FY 1997 and FY 1998). The program will assess and prioritize HPC requirements for DCs and will acquire and deploy new systems or upgrades to existing systems as needed to accomplish S&T and DT&E mission needs which cannot be met most effectively or efficiently at the MSRCs.

(U) Networking: With the award of the DREN Intersite Services Contract (DISC), the primary network service will become operational, providing 10 Megabits per second (Mbps) to 155 Mbps services to the community in the first year. Additional nodes will be installed at DT&E facilities as those requirements are incorporated into the program. Service is being extended to Alaska and Hawaii. Approximately ten existing nodes in the interim network will be upgraded from 1.5 Mbps service to 10 Mbps service, and two additional 45 Mbps long haul connections will be installed. (\$17.260 million)

(U) Software Applications Support: Development efforts in the CHSSI program component continues throughout FY 1997. CHSSI, comprised of approximately 50 core projects, will develop shared scalable applications supporting software to exploit scalable HPC assets to their fullest. (\$20.000 million)

(U) MSRC and Distributed Center Sustainment: The program will sustain and support the integration, operation, and use of existing HPC resources at the four MSRCs. The program will fund maintenance expenses for the HPC systems at the DCs. The program will fund sustainment and operations at the MHPCC and the ARSC in accordance with FY 1997 Congressional language. Although not formally a HPCMP DC because it lacks a DoD sponsor, ARSC funding is included in the DC totals. (\$80.800 million total=MSRCs \$50.210 million + DCs \$30.590 million)

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(U) Program Management and Administration: This effort includes the functions of overall program management, planning and direction, including support for Program Management Office personnel and facilities, throughout the program's lifecycle. FY 1997 costs are projected to be lower than FY 1996 because of completion of large acquisition management functions for the MSRC and DISC contracts. (\$4.840 million)

(U) FY 1997 RDT&E funds are allocated as follows:

(\$ Millions)

Networking	17.260
Software Applications Support	20.000
MSRC and Distributed Center Sustainment	80.800
Program Management & Administration	4.840
TOTAL	122.900

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(U) · FY 1998 Plans:

- (U) Shared Resource Centers: The program will sustain the existing capability and continue the modernization process by acquiring additional HPC systems, storage, and scientific visualization capabilities to populate and upgrade the established MSRCs to fulfill the projected and growing HPC requirements of the laboratories and R&D centers. Contract options will continue to be executed to upgrade performance at four MSRCs, minimally tripling their computing capability over the two year period (FY 1997 and FY1998). The program will continue assessing and prioritizing HPC requirements for DCs and will acquire and deploy new systems or upgrades to existing systems as needed to accomplish RDT&E mission needs.
- (U) Networking: The primary DREN network service provided by DISC will continue operation, providing 10 Megabits per second (Mbps) to 155 Mbps services to the community. Additional nodes will be installed at DT&E facilities as those requirements are incorporated into the program. Transition from IDREN to DREN will continue into and be completed in FY 1998. (\$26.064 million)
- (U) Software Applications Support: Development efforts in the CHSSI program component will continue. CHSSI, comprised of approximately 50 core projects, will continue developing shared scalable applications supporting software to exploit scalable HPC assets to their fullest. (\$21.931 million)
- (U) MSRC Sustainment: The program will sustain and support the operation and use of DoD HPC resources at the four Major Shared Resource Centers. The majority of initial equipment and related contractor support will be implemented at the MSRCs during FY 1997. Full twelve month annualized sustainment costs for this initial Performance Level 1 capability is included in the FY 1998 total. (\$72.876 million)

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(U) Distributed Center Sustainment: Prior to FY 1998, the HPCMP funded investment and related equipment maintenance at the DCs. At selected centers, the HPCMP also provided partial funding of sustainment costs. Beginning in FY 1998, the HPCMP will no longer fund sustainment or operations of the DCs. Due to program funding limitations recognized two years ago, a decision was made to support investments in HPC systems at new or existing DCs with HPCMP procurement funding. In return for the HPCMP investment, the DC organization agrees to appropriately fund the sustainment and operations of the HPCMP equipment located at the site.

(U) Program Management and Administration: This element includes the functions of overall program management, planning and direction, including support for Program Management Office personnel and facilities, throughout the program's lifecycle. Additional FY 1998 funding will support program documentation updates. (\$5.340 million)

(U) FY 1998 RDT&E funds are allocated as follows:

(\$ Millions)

Networking	26.064
Software Applications Support	21.931
MSRC Sustainment	72.876
Program Management & Administration	5.340
<b>TOTAL</b>	<b>126.211</b>

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(U) FY 1999 Plans:

(U) Shared Resource Centers: The program will sustain the existing capability and continue the modernization process by acquiring additional HPC systems, storage, and scientific visualization capabilities to populate and upgrade the established MSRCs to fulfill the projected and growing HPC requirements of the laboratories and R&D centers. Contract options will continue to be executed to meet the required performance levels at the four MSRCs, minimally tripling their computing capabilities from the previous performance levels over the two year period (FY 1999 and FY 2000). The program will continue to identify evaluate and prioritize HPC requirements for DCs and will acquire and deploy new systems or upgrades to existing systems as needed to accomplish RDT&E mission needs.

(U) Networking: Network connectivity will be sustained for HPCM users. Options to increase bandwidth at selected sites will be executed, and additional sites will be added to DREN. (\$34.915 million)

(U) Software Applications Support: Development efforts in the CHSSI program component will continue. (\$22.855 million)

(U) MSRC Sustainment: The program will sustain and support the operation and use of expanding HPC resources at the four Major Shared Resource Centers. The additional funds requested will provide for a full year of sustainment and operations for those systems purchased and deployed in FY 1998. Also partial year sustainment and operations for systems purchased and deployed in FY 1999 is included in the total FY 1999 funding requested. (\$ 85.441 million)

(U) Program Management and Administration: Overall program management, planning and direction, including support of the Program Management Office personnel and facilities will continue. Planning for a new series of acquisitions for integration services and upgrades at the MSRCs will be initiated in FY 1999. (\$5.641 million)

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(U) FY 1999 RDT&E funds are allocated as follows:

(\$ Millions)

Networking	34.915
Software Applications Support	22.855
MSRC Sustainment	85.441
Program Management & Administration	<u>5.641</u>
TOTAL	148.852

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	\$ in Millions				
(U) B. <u>Program Change Summary</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>To Complete Total Cost</u>
Previous President's Budget	114.961	99.880	109.183	126.859	Continuing Continuing
Appropriated Value		124.880			
Adjustments to Appropriated Value					
a. Congressionally-directed undistributed reduction		(1.980)			
b. Recision, Below-threshold Reprogramming, inflation adjustment					
c. Other	(3.341)		17.028	21.993	
Current President's Budget	111.620	122.900	126.211	148.852	Continuing Continuing

(U) Change Summary Explanation:

(U) **Funding:** The change in appropriated values for Fiscal Years (FYs) 1996-1997 are reflective of minor program budget adjustments and amended fiscal guidance. The changes in FYs 1998-2003 are reflective of increased costs in integration and sustainment, Networking and Software Applications Support. These needed increases were offset by realignment of funding from the program's Procurement account to RDT&E.

(U) **Technical:** The MSRC sustainment costs result from significant expansion of the HPC systems at the Major Shared Resource Centers, requirements for greater network bandwidth and more network connections, and the need for effective support software to achieve the higher performance potential of the newer HPC systems.

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(U) C. Other Program Funding Summary Cost

Procurement Line P-1 Line, PROCUREMENT, DEFENSE-WIDE (OSD High Performance Computing - Major Equipment)

(\$ in Millions)						
<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>
101.405	123.969	91.852	84.505	66.981	43.611	54.905
					54.189	Continuing
						Continuing
						Total Cost

MILESTONE SCHEDULE:

Milestone II Decision Review  
Issue RFP for DREN (DISC)  
Technical Evaluations (MSRCs)  
Awards for MSRC Contracts (Performance Level 1)  
Award for DREN (DISC)  
MSRC Performance Level 1 Capability Installed  
In-Process Review  
HPC Modernization Plan Updated  
MSRC Performance Level 2 Capability Installed  
DREN Initial Performance Capability  
IDREN to DREN Transition Complete  
MSRC Performance Level 3 Capability Installed  
MSRC Follow-on Contract(s) (Recompete)  
DREN Follow-on Contract (Recompete)

Fiscal Years

1Q 1996  
2Q 1996  
3Q 1995-2Q 1996  
2Q, 3Q, 4Q 1996  
4Q 1996  
1Q 1997-3Q 1997  
2Q 1997  
2Q 1997  
2Q 1997- 3Q 1998  
3Q 1997  
4Q 1998  
2Q 1999- 3Q 2000  
2H 2001  
4Q 2001

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RDT&E, Defense Wide/BA 3											
COST ( <i>In Millions</i> )		FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost		72.183	59.331	71.338	74.614	77.199	79.515	81.204	83.122	Continuing	Continuing
Project Name/No. and Subtotal Cost JSM/P476		72.183	59.331	71.338	74.614	77.199	79.515	81.204	83.122	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT:

(U) This program element was established in response to congressional guidance to coordinate simulation policy, to establish interoperability standards and protocols, to promote simulation within the military departments, and to establish guidelines and objectives for coordination of simulation, war-gaming, and training. As a consequence, M&S can substantially improve capabilities and decision making in each of the four pillars of military capability: (1) readiness; (2) modernization ; (3) force structure; and (4) sustainability. In order to promote effective and efficient use of M&S within the Department of Defense (DoD), this program element has facilitated significant advances in M&S in four areas: architectures, standards, and protocols; representation of the environment, systems, and human behavior; fielding of M&S and associated infrastructure; and outreach activities. As a result, there is better sharing of information, capabilities, and resources within and among key DoD modeling and simulation (M&S) communities.

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(U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

(U) **FY 1996 Accomplishments:**

- (U) Developed prototypes of High Level Architecture (HLA) Runtime Infrastructure software and a collection of prototype federations to test the HLA as a means to facilitate interoperability among all types of simulations; Revised the HLA Interface specification, the HLA object Model Template, and the underlying technical principles in accordance with the experience gained in the prototype efforts; Developed the Baseline Definition of the HLA; Identified requirements for support software, such as testing and Federation Object Modeling (FOM) development tools. (\$23.997 million)
- (U) Developed and evaluated two designs for the implementation of security guards and trusted agents for HLA; Initiated prototypes of selected techniques to be tested with the HLA proto-federation; Completed studies of the required security policies and technologies concerning the release of models and data bases of U.S. and threat capabilities for the unclassified version of Modeling and Simulation Resource Repository (MSRR). (\$415 million)
- (U) Initiated development of Modular Reconfigurable C4I Interface (MRCI) prototype version 1.0. (\$4.330 million)
- (U) Initiated development of Conceptual Models of the Mission Space (CMMS) to provide consistent and authoritative M&S representations, and to facilitate interoperability and reuse of simulation components; Begin to integrate Component knowledge acquisition projects into CMMS. (\$6.120 million)

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- (U) Refined and expanded complex data concepts and capabilities; Built prototype data interchange formats (DIFs) for selected M&S applications; Initiated development of an exportable Data Quality Engineering (DQE) tool for graphically describing the quality of data. (\$2.740 million)
- (U) Determined initial set of requirements necessary for authoritative representations of terrain, atmosphere, oceans and space; Established initial capability to interchange 3D model data through use of a common data model and application programmer interface; Demonstrated an initial capability to produce a standard 2500 km<sup>2</sup> terrain database within 1 week to meet M&S functional area requirements. (\$15.860 million)
- (U) Conducted four technical exchange workshops to assess state-of-practice in modeling Human Behavior Representation (individual and group); Initiated 18 month, two phase study at national level. (\$.317 million)
- (U) Developed Validation, Verification, and Accreditation (VV&A) standards and recommended practices guide; Published DoD Instruction for VV&A. (\$.519 million)
- (U) Developed functional technical requirements for M&S Resource Repositories (MSRR) and set up the initial infrastructure; Demonstrated initial functions for a Master Environmental Library integrated with MSRR. (\$6.175 million)
- (U) Initiate development of Joint Simulation System prior to the establishment of separate program element. (\$5.252 million)
- (U) Established a prototype Modeling and Simulation Operational Support Activity (MSOSA) that focuses on support of the training and military operations community as proof of concept; Assessed prototype performance and adjusted MSOSA structure and procedures. (\$1.725 million)
- (U) Initiated M&S Impact Assessment Project. Collected empirical data from components. (\$1.400 million)

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- (U) Completed development of expandable executive level course on M&S; Conducted technical seminars, workshops and symposia on M&S; Inserted M&S technology in major joint warfighter exercises. (\$3.333 million)
- (U) **FY 1997 Plan**
- (U) Assess DoD simulation programs for HLA compliance; Identify modification to legacy system interoperate through HLA; Identify requirement for industry standardization of HLA components; Complete reference implementation of Runtime Infrastructure software; Continue development of support software, including testing and FOM development tools; Identify security architecture for HLA. (\$22.628 million)
- (U) Continue prototyping, including demonstrations, of the HLA security guards and trusted agents required to support models and simulations operating at different levels of classification; Continue to evolve security policies with the identified Designated Approval Authorities within the community. (\$400 million)
- (U) Complete development of MRCI prototype version 1.0; develop technical specifications for competitive procurement; Initiate development, integration, test and standardization of common modules. (\$4.600 million)
- (U) Complete prototype CMMS; Conduct user evaluations of prototype CMMS capabilities; Begin development of operational CMMS. (\$1.820 million)

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- (U) Prototype a complex data solution for selected M&S applications; Analyze tools to support complex data implementations; Develop prototype distributed set of M&S 3D visual models; Expand DIF's to include key data areas supporting M&S federation development; Expand the Data Quality Engineering (DQE) tool to comply with open database connectivity (ODBC) standards; Develop tools for graphically describing a data quality profile; Initiate and complete Validation, Verification and Certification (VV&C) studies. (\$2.850 million)
- (U) Identify models; Define requirements for chemical, biological and nuclear weapons effects; Demonstrate the capability to produce standard terrain data to meet M&S functional area requirements contained within a nominal 2500 Km<sup>2</sup> area (with three-dimensional terrain, including three-dimensional man-made features, reasonably attributed), within 72 hours; Demonstrate the initial capability to generate and/or receive and apply data updates to standard synthetic environment databases form multiple sources and document the configuration control process; Define an initial set of standard and dynamic process representations for the atmosphere, space and ocean environment in virtual and constructive simulations; develop data dictionaries from generated requirements describing location, feature content, lineage, current status, and attribution information for all atmosphere and space data and data sets; Demonstrate interchange of synthetic environment database through use of a common interchange specification and application program interfaces. (\$15.033 million)
- (U) Identify critical needs/shortfalls M&S technologies required to support the DoD Acquisition Process. (\$0.225 million)
- (U) Continue study of state-of-the-art/state-of-practice for human behavior representation; Establish requirements and priorities of human behavior representation; Establish initial human behavior representation conceptual framework. (\$.664 million)
- (U) Initiate development of VV&A software tools suite; Develop VV&A multi-media training package. (\$1.200 million)
- (U) Develop and prototype configuration control procedures and tools to access, modify, and update the resources in the MSRR; Complete MSRR prototyping. (\$4.700 million)

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- (U) Expand prototype MSOSA operations capability to serve all Department of Defense modeling and simulation communities (training, acquisition, and analysis); Assess expanded prototype MSOSA's performance and adjust structure and procedures accordingly; Modify the MSOSA Operational Support System (OSS) to support MSOSA's transition to full operating capability; Integrate the MSOSA OSS into the Modeling and Simulation Resource Repository (MSRR) as a node. (\$3.832 million)
- (U) Refine the analytical framework for M&S Impact Assessment; Publish training and analysis Impact Assessment. (\$.600 million)
- (U) Develop DoD-wide M&S education and training plan; Conduct technical seminars, workshops and symposia on M&S; Initiate transition of executive level course to the WWWW; Insert M&S technology in major joint warfighter exercises. (\$.775 million)
- (U) **FY 1998 Plans:**
- (U) Continue development of support software for testing and FOM development; Incorporate modification to legacy systems to interoperate through HLA; Competitive procurement process completed; Continue development, integration, test and standardization. (\$25.306 million)
- (U) Continue to develop security policies for the Modeling and Simulation Resource Repository as the application of M&S is enhanced and expanded; Implement guards and trusted agents into selected M&S programs operating at different level of security; Develop plans and strategies for the design and development of M&S techniques that employ full-up Multi-Level Secure Computing Platforms. (\$.700 million)
- (U) Continue development, integration, test and standardization of MRCI common modules. (\$2.000 million)
- (U) Integrate operational CMMS into M&S Resource Repository (MSRR); Continue to integrate Component knowledge acquisition projects into CMMS; Conduct research and integrate new technology into CMMS. (\$2.708 million)

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- (U) Develop tools to perform complex data work; Enhance Data Interchange Formats (DIFs) to cover all areas of taxonomy; Prototype the means to allow automated data retrieval for classified and unclassified data. (\$3.630 million)
  
- (U) Develop a standard methodology for interconnecting simulations using environmental models of differing resolution; Define and develop process representations for natural and man-made perturbations on atmospheric and space representations; Demonstrate the capability to generate and receive data updates from multiple sources, and apply them to databases supporting engineering-grade synthetic environments (including full documentation of all appropriate configuration control and certification processes). (\$20.351 million)
  
- (U) Initiate development of prototypes that address critical DoD Acquisition Reform requirements for the implementation of life-cycle based simulation technology; Assess state-of-the-art M&S technology for insertion into on-going major defense acquisition program developments. (\$3.900 million)
  
- (U) Test, refine and standardize proposed conceptual framework through selected individual and group Human Behavior Representation efforts; Expand Human Behavior Representation from traditional mid-level operations to Information Warfare and Operations Other Than War; Implement prototype efforts of various categories and human behavior variables. (\$1.515 million)
  
- (U) Complete development of VV&A software tool suite; Extend VV&A practices and procedures for analysis and acquisition communities. (\$1.895 million)
  
- (U) Provide limited operational capability for configuration control procedures and tools to access, modify, and update the resources (e.g., process models, data models, directories, data, algorithms, models and simulations, authoritative data sources) in the MSRR; Populate MSRR and develop transition requirements; Modify software based on user requirements; Establish full time information domain coordinators; Continue documentation of MSRR. (\$3.500 million)

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- (U) Develop and expand capabilities to include increased interoperability to real world C2 systems, planning tools, and other modeling and simulation assets; Assess MSOSA performance and adjust structure and procedures to meet evolving user needs; Develop full scale MSOSA Operational Support Activity; Upgrade MSOSA operational support system to incorporate current developments in electronic information research and network technologies. (\$4.283 million)
- (U) Initiate the Impact Assessment of M&S in support of acquisition programs; Revise analytical framework to incorporate the impact of inserting M&S tools into the acquisition process. (\$.750 million)
- (U) Finalize DoD-wide M&S education and training plan; Expand M&S executive level course to incorporate acquisition process; Conduct technical seminars, workshops and symposia on M&S; Insert M&S technology into major joint warfighter exercises. (\$.800 million)
- (U) **FY 1999 Plans:**
- (U) Continue development of HLA technology, next generation prototypes; Expand support to modeling and simulation users in order to enable them to exploit fully the increased capabilities that will be fielded under the HLA initiative, to include JSIMS and JWARS. (\$11.584 million)
- (U) Design, develop and prototype the M&S technologies required to implement full range system level Multi-Level Security in the applications of training, analysis and acquisition. (\$3.148)
- (U) Initiate development of interfaces to fielded intelligence systems; Continue development, integration, test and standardization of MRCI common modules. (\$3.150 million)

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- (U) Conduct research into CMMS knowledge acquisition methods and tools; Initiate research into CMMS visualization technology. (\$1.052 million)
- (U) Develop tool functionality for emerging M&S data requirements; Complete development of technology for automated data retrieval of classified and unclassified data. (\$2.753 million)
- (U) Enhance methodology to provide the full capability of interoperable and interchangeable dynamic multiple resolution synthetic environments. (\$18.041 million)
- (U) Complete development of selected prototypes of the implementation of acquisition-based simulation technology; Populate the Modeling and Simulation Resource Repository with advanced M&S technology for insertion into on-going acquisition programs. (\$12.400 million)
- (U) Continue to develop Information Warfare representations and operations other than war and initiate the development of new models for individual and group behavior. (\$2.452 million)
- (U) Enhance VV&A tool suite for analysis and acquisition applications. (\$1.750 million)
- (U) Refine and enhance the capability of the models and simulations developed to support DoD's acquisition process. (3.713 million)

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- (U) Modify and enhance MSRR common, physical and software infrastructure based on network and database state-of-art and user requirements; Continue documentation of MSRR; Finalize population of a distributed MSRR system providing: (a) directories /catalogs; (b) data standardization resources (e.g., process and data models, data dictionary); (c) reusable data, algorithms, models and simulations; and (d) tools for browsing and accessing, linking across resources, configuration management etc; Initiate transition to appropriate agency; Modify software based on user requirements. (\$5.617 million)
- (U) Enhance interoperability with fielded C4I systems under the Defense Information Infrastructure; Extend capability to meet increased user needs. (\$6.554 million)
- (U) Initiate the development of tools and automated methods to perform cost and benefit impact assessment as new simulations for training, analysis, and acquisition emerge. (0.850 million)
- (U) Institute development of fully interactive basic, intermediate and executive level courses that address training, acquisition and analysis domains; Conduct technical seminars, workshops and symposia; Insert M&S technology into major joint warfighter exercises. (\$1.550 million)

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(U) B. <u>Program Change Summary</u>	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>To Complete</u>	<u>Total Cost</u>
Previous President's Budget	74.624	59.968	71.575	74.969	Continuing	Continuing
Appropriated Value						
Adjustments to Appropriated Value:						
a. Congressional Undistributed	(2.441)	(.637)				
b. Below Thresholds			(.237)	(.365)		
c. Other Changes			71.338	74.614	Continuing	Continuing
Current President's Budget	72.183	59.331				

Change Summary Explanation:

Funding: FY 1996 Changes due to Congressional Undistributed Reductions. FYs 1998-99 are due to minor program budget adjustments.  
 Schedule: Not Applicable  
 Technical: Not Applicable

(U) C.	<u>Other Program Funding Summary</u>	None
(U) D.	<u>Schedule Profile</u>	Not Applicable

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COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
	19.096	23.198	31.553	32.536	33.152	32.309	32.745	33.258	Continuing	Continuing
Total Program Element (PE) Cost	19.096	23.198	31.553	32.536	33.152	32.309	32.745	33.258	Continuing	Continuing
PHYSICAL SECURITY EQUIPMENT PSE P228										

A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT: This program is a budget activity level 4 based on the demonstration/validation activities ongoing within the program. The purpose of this program is to develop physical security equipment (PSE) systems and to safeguard DoD acquisition information for all DoD components. This program supports the protection of Nuclear Weapons, tactical and nuclear weapons systems, DoD personnel and DoD weapon systems. Funding for critical RDT&E security improvements within service channels has fluctuated widely over the years and prompted the consolidation of the Services and Defense Special Weapons Agency (DSWA) PSE RDT&E funds into this single OSD controlled program element.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS: This program was originally formed by the Congressional consolidation of the three Services and the DSWA RDT&E PSE budget submissions for FY 1989. The funds are used to provide PSE RDT&E for individual Service and joint PSE requirements. The PSE program is organized so that an ongoing DoD-coordinated Joint Action Group, consisting of Army, Navy, Air Force, and Defense Special Weapons Agency (DSWA) representatives monitor, direct, and prioritize potential and existing PSE programs. With few exceptions, each Service sponsors RDT&E efforts for technologies and programs which have multi-service applications. In several cases, applications are unique to only one service. The funds are also employed in support of the DSWA exploratory developmental PSE effort for the protection of nuclear weapons by expanding technology and techniques (through proof-of-concept) to improve nuclear security. This program element supports the Army's advanced and engineering development of Interior Detection, Exterior Detection, Security Lighting, Security Barriers and Security Display Units. In a like manner, the program element also supports the Air Force's PSE RDT&E effort in the area of Exterior Surveillance, Entry Control and Airborne Intrusion. Finally, the program supports Navy RDT&E efforts in the areas of Shipboard

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Security, Waterside Security, Explosive Detection, Locks and anti-compromise/emergency destruction of classified material equipment. Recent concerns regarding the protection of DoD weapon systems acquisition information at DoD RDT&E facilities has led to an expanded role for this Program Element since FY 1995. Beginning in FY 97, this PE also includes funding for Force Protection Commercial-Off-The-Shelf (FP COTS) Testing which has received focus since the 1996 Khobar Towers bombing incident. This FP COTS testing applies to all available technologies which are considered for effective DoD use.

## (U) FY 1996 Accomplishments:

- TACTICAL AUTOMATED SECURITY SYSTEM (TASS) (3.590 million)
- Completed Contractor Test and Evaluation (CT&E) activities at Hanscom AFB, MA.
  - Completed Qualification Test and Evaluation (QT&E) at Eglin AB, FL.
  - Completed Qualification Operational Test and Evaluation (QOT&E) at Camp Bullis, TX.
  - Prepared TASS Production Request for Proposal (RFP).
  - Integrated Army Tactical Security requirements into TASS production program.
  - Performed initial exploration of Video Motion Detection (VMD) capability that can be integrated into TASS.
  - Reassigned VMD project to Security Enhancement and Threat Reduction (SETR) Project.
- ADVANCED ENTRY CONTROL SYSTEM (AECS) (0.400 million)
- Corrected 95% of deficiencies found during QT&E testing.
  - Conducted technical evaluation of the IriScan biometric identifier for applicability to the AECS product baseline.
  - Conducted Site Surveys for system installations.
- ADVANCED EXTERIOR SENSOR (AES) (0.200 million)
- Supported DSWA technology assessment.
  - Initiated planning for transition of project from DSWA.

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## JOINT SECURITY MODELING CAPABILITY (JSMC) (0.200 million)

- Transitioned program management responsibility to Joint War Fighting Center.
- Completed Air Force features and capabilities modifications to the model.
- Transitioned production phase.

## DELAY/DENIAL--SABER 203 (0.740 million)

- Awarded EMD contract for Saber 203 system.
- Initiated support activities with Armstrong and Phillips Laboratories.

## SECURITY ENHANCEMENT AND THREAT REDUCTION (SETR) (0.270 million)

- Prepared project plan to integrate Video Storage System (VSS) with operational alarm annunciators.
- Performed market survey for VSS.

## MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM (MDARS) - Interior (MDARS-I) (2.664 million)

- HQDA revalidated Operational Requirements Document (ORD).
- Prepared acquisition strategy; subsequently approved.
- Initiated planning for early user appraisal at Defense DLA designated Anniston Army Depot.
- Began navigational testing under operational conditions at Camp Elliott (US Army facility), San Diego, CA.
- Installed system in NCCOSC HQ to further evaluate system operational capabilities.
- Performed formal market investigation on radio frequency (RF) tag technology.

## MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM (MDARS) - Exterior (MDARS-E) (2.597 million)

- Completed the Concept Formulation Package (CFP), including the Trade-Off Determinations (TOD), Trade-Off Analysis (TOA), Best Technical Approach (BTA), and Cost Operational Effectiveness Analysis (COEA).

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- Prepared acquisition strategy; subsequently approved.
- Prototype competed and successfully demonstrated under BAA contract.
- Continued development of navigation and sensor modules.
- Initiated and completed MDARS internal lock prototype development through support of NFESC33.

## HIGH VALUE ITEM SECURITY SYSTEM (HVISS) (0.350 million)

- HQDA approved Mission Needs Statement (MNS). (Phase I)
- Market investigation and trade-off determination completed. (Phase I)
- Milestone 0 Requirements completed. (Phase I)
- Harmonization results - Joint Service interest and DLA. (Phase I)
- High Value Asset Security Cage (HVASC) program initiated. (Phase I)
- Draft ORD completed. (Phase II)

## PLATOON EARLY WARNING DEVICE-II (PEWD-II) (0.385 million)

- USAIC designated the combat developer.
- ORD developed and staffed.
- Initiated market investigation to identify NDI/COTS systems candidate.

## INTEGRATED COMMERCIAL INTRUSION DETECTION DEVICE (ICIDS) (.250 million)

- Conducted market surveillance supporting technology insertions.

## WATERSIDE SECURITY SYSTEM (WSS) (1.710 million)

- Installed a complete system at Submarine Base Kings Bay, GA.
- Completed Operator Training at Submarine Bangor, WA.
- Began work on development of software for a transportable system based on PC architecture.
- Conducted site survey for WSS at Weapons Station Earl, NJ.

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ELECTRONIC SECURITY SYSTEM (ESS) (0.300 million)

- Continued the ongoing low cost effort to evaluate and monitor the commercial off-the-shelf (COTS) electronic security sensors/systems used at Navy ashore facilities as well as onboard ship.
- Evaluated emerging technologies in biometrics, specifically facial recognition.
- Analyzed open system software specifications and to establish system interfaces allowing existing DoD security systems to interoperate with other COTS systems.

SHIPBOARD PHYSICAL SECURITY (SPS) (0.700 million)

- Developed training, maintenance and configuration control plans for the SPS sonar.
- Completed system software reliability testing.
- Completed all developmental testing of the WQX-2 Sonar.
- Installed prototype access control and Intrusion Detection System (IDS) onboard three Navy vessels.
- Evaluated Commercial-off-the-Shelf (COTS) technologies for shipboard applications.
- Participated in introducing state-of-the-art technology on Smart Ship.
- Coordinated Smart Ship/Smart Base initiatives.
- Tested "smart card" on USS Yorktown.

DoD LOCK PROGRAM (1.475 million)

- Developed a modular internal locking system (including boltwork designs) for use on conventional AA&E storage magazines.
- Evaluated COTS technologies and tested a variety of lock designs.
- Tested and evaluated COTS tools for forced, covert, surreptitious entry.
- Initiated a study of material properties with physical security applications.
- Completed the development of a lockout override for the High Security magazine.

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- Continued development of the lock program data base.
- Continued security seal requirements analysis project.
- Initiated NSI destruct analysis/development of User guidance project.
- Continued development of interlocking device interface for MDARS program.
- Initiated GSA container drawer head replacement project.

## PORTABLE EXPLOSIVE DETECTION (PED) (0.025 million)

- Completed testing of promising COTS technologies.

## ANTICOMPROMISE EMERGENCY DESTRUCT (AECD) (0.090 million)

- Completed Hard Disk Drive (HDD) thermite destruct system design feasibility phase.
- Completed destruct level analysis of 2 HDD tests.
- Published ACEDS Study Report.
- Published HDD Destruct Design Report.

## TECHNOLOGY BASE (3.150 million)

Completed and demonstrated prototype hardware for the intrusion detection distributed array, radially-sensitive passive infrared motion sensor, and the passive millimeter wave sensor. In addition, completed a study on laser countermeasures, and continued the evaluation of prototype hardware for he self-powering wireless sensor, passive millimeter wave sensor for exterior applications, and the nuclear quadrupole resonance sensor systems.

(U) FY 1997 Plans:

## FORCE PROTECTION COMMERCIAL-OFF-THE-SHELF ASSESSMENTS (FP COTS) (5.000 million)

- Develop a FP COTS testing methodology.
- Review User Force Protection requirements.

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- Prepare a market survey, develop, and produce a listing of Commercially available Non Developmental Items for Force Protection uses.
- Perform crosswalk of requirements and available technologies.
- Develop a database to meet test support resource requirements.
- Identify and prioritize technologies for FP COTS testing and evaluations in both FY 1997 and 1998.
- Perform test and evaluations of selected COTS equipment/systems.
- Publish a FY 1998 FP COTS test and evaluation schedule.

TACTICAL AUTOMATED SECURITY SYSTEM (TASS) (1.045 million)

- Conduct source selection
- Begin work to replace radio frequency alarm transition mode with millimeter wave.

ADVANCED ENTRY CONTROL SYSTEM (AECS) (0.250 million)

- Complete Technical Order Verification.
- Complete QOT&E.
- Conduct system functional tests to confirm system performance and final verification of deficiency corrections.
- Integrate VSS with AECS.

ADVANCED EXTERIOR SENSOR (AES) (0.200 million)

- Accomplish program transition from DSWA to Air Force.
- Identify risk reduction activities.
- Prepare system functional description.
- Develop acquisition strategy.

DELAY/DENIAL--SABER 203 (2.130 million)

- Continue Engineering and Manufacturing Development phase of program.

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- Complete Contractor Test and Evaluation for the Saber 203 system.
  - Initiate contracting action for development of an Eye Safe at the Aperture (ESATA) product improvement project.
  - Build equipment sets for Operational Test and Evaluation.
  - Initiate HALT (ESATA) EMD contract.
- SECURITY ENHANCEMENT AND THREAT REDUCTION (SETR) (0.375 million)
- Transition exterior Video Motion Detection (VMD) project from TASS.
  - Develop VMD product functional description for integration with CCTV or thermal cameras.
  - Evaluate developed AES algorithm for performance and integration with CCTV or thermal cameras.
  - Develop acquisition strategy for Video Storage System (VSS) integration project.
  - Initiate Advanced Systems Concepts project.

## MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - INTERIOR (MDARS-I) (2.615 million)

- Complete prototype development to enter internal and independent testing.
- Conduct Category III system functionality testing to internally validate system performance.
- Complete technical feasibility testing II of the system to satisfy the independent test requirements for Milestone II.
- Conduct Early User Appraisal (EUA) preparatory phase of the system deployment at Anniston Army Depot, including installation of power and communications equipment and initial development of robot patrol paths.
- Initiate installation phase of the system deployment at Anniston Army Depot in preparation for EUA.

## MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - EXTERIOR (MDARS-E) (3.611 million)

- Continue development to achieve integration of platform, autonomous navigation and sensor module in order to demonstrate operational characteristics and capabilities.
- Demonstrate a two vehicle system with obstacle avoidance and teleoperation functionality.



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## HIGH VALUE ITEM SECURITY SYSTEM (HVISS) (0.381 million)

- Finalize HVASC requirements and define concept. (Phase I)
- Design two prototypes for evaluation. (Phase I)
- Conduct Early User Appraisal. (Phase I)
- Integrate user input and finalize technical data package. (Phase I)
- Award procurement package. (Phase I)
- Complete trade-off analysis. (Phase II)
- Complete project plan. (Phase II)
- Initiate COEA. (Phase II)
- Complete ORD Staffing. (Phase II)
- Award RFID R&D prototype development contract. (Phase II)

## PLATOON EARLY WARNING DEVICE II (PEWD-II) (0.391 million)

- HQDA validate the ORD.
- Development program management plan.
- Identify candidate NDI/COTS equipment that may meet ORD requirements.
- Evaluate candidate NDI/COTS systems to determine requirement shortfalls.
- Develop technical development plan as may be required.
- Develop logistics concept.
- Evaluate USAF developed TASS for use by Army.

## WATERSIDE SECURITY SYSTEM (WSS) (1.845 million)

- Complete Operator Training and Developmental Testing at Submarine Base Kings Bay, GA.
- Conduct a WSS demonstration project at SUBASE San Diego incorporating PC based architecture and the Intrusion Detection Distributed Array (IDDA).
- Transition the IDDA 6.2 effort from the Defense Special Weapons Agency to the WSS program for 6.3/6.4 work.

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PHYSICAL SECURITY EQUIPMENT  
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- Begin work on developing underwater assessment capabilities via an underwater security vehicle (USV)
  - Conduct advanced technology demonstration of WSS at Weapons Station Earl, NJ.
- ELECTRONIC SECURITY SYSTEM (ESS) (1.290 million)
- Continue the ongoing low cost effort to evaluate and monitor the state-of-the-art of commercial off-the-shelf (COTS) electronic security sensors/systems commonly used at Navy ashore facilities as well as onboard ship.
  - Continue to evaluate emerging technologies in biometrics.
  - Continue to evaluate open system software specifications to allow existing DoD security systems to be interoperable with other systems.
  - Continue smart ship/smart base efforts and conduct COTS test and evaluation.

### DoD LOCK PROGRAM (1.515 million)

- Continue development of a modular internal locking system (including boltwork designs) for use on conventional AA&E storage magazines
- Continue reviewing commercial practices of existing lock technologies and continue test and evaluation of replacement lock designs.
- Complete Security Seals project.
- Continue Physical Security Materials Study.
- Complete the drawer head replacement project.
- Initiate requirements analysis and selection of COTS locking system for sidelocking containers.
- Develop dual key capability for conventional interlocking device.
- Analyze effective ceiling tile clip locks.

ANTICOMPROMISE EMERGENCY DESTRUCT (AECD) (0.050 million)

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- Continue with low cost sustained effort to assess state-of-the-art encryption techniques for the protection of data on Hard Disk Drives.
- Other issues to be resolved include but not limited to, protection of encryption key (s), level of encryption required for different applications.

TECHNOLOGY BASE (2.500 million) Complete and demonstrate prototype hardware for the self-powering wireless sensor, the passive millimeter wave sensor for exterior applications, the advanced exterior sensor system (AES), the millimeter wave data link. In addition, initiate new service sponsored projects for an improved laser diode, miniaturized radio frequency tags, underwater security vehicle with acoustic guidance, sonic denial systems, and an acoustic detection and classification sensor for use on a mobile platform. If FY 1997 funds are adequate, initiate the development of a passive optical motion sensor, tactical security sensor integration and advance interfaces, and improved anti-tailgate detection.

(U) FY 1998 Plans:

- FORCE PROTECTION COMMERCIAL-OFF-THE-SHELF ASSESSMENTS (FP COTS) (13.100 million)
- Perform scheduled FY 1998 test and evaluations of selected COTS equipment/systems.
  - Publish appropriate reports.
  - Publish User's Guide of Commercially available Non Developmental Items for Force Protection uses.
  - Update methodology and publish test and evaluation schedule for FY 1999.

TACTICAL AUTOMATED SECURITY SYSTEM (TASS) (1.425 million)

- Design a secure radio frequency (RF) network for TASS.
- Design and implement an RF Video Link for Thermal Imagers.
- Investigate new COTS security sensors.

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## ADVANCED ENTRY CONTROL SYSTEM (AECS) (0.100 million)

- Investigate interface requirements for, and potential use of, state of the art COTS security system components and sensors as part of the AECS product baseline.

## ADVANCED EXTERIOR SENSOR (AES) (2.422 million)

- Release RFP and award contract for prototype system demonstration.

## DELAY/DENIAL--SABER 203 (0.678 million)

- Complete Saber 203 OT&E.
- Finalize Saber 203 system production baseline.
- Award production contract.
- Prepare for DSWA transition of Laser Countermeasures project.
- Transition Laser Diode improvement program from DSWA to USAF.

## SECURITY ENHANCEMENT AND THREAT REDUCTION (SETR) (0.375 million)

- Test, evaluate & qualify VMD products for integration in existing surveillance camera systems and generate procurement specifications.
- Develop AES VMD algorithm to meet performance and sustainability requirements.
- Integration contract for Video Storage System (VSS) storage to improve capability of existing alarm annunciation systems.
- Continue Advance Systems concept project.

## MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - INTERIOR (MDARS-I) (2.725 million)

- Conduct Milestone II In-Process Review (IPR) and award two (2) competitive procurements with production options.
- Complete a multi-unit EUA at an operational site.

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- MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - EXTERIOR (MDARS-E) (2.481 million)
- Continue engineering development through to completion.
  - Incrementally demonstrate the system with progressive levels of subsystem integration.
  - Conduct final demonstration.
- HIGH VALUE ITEM SECURITY SYSTEM (HVISS) (0.174 million)
- Continue evaluation and testing.
  - Conduct field demonstration.
- PLATOON EARLY WARNING DEVICE II (PEWD-II) (0.109 million)
- Modify existing NDI/COTS system to meet Army PEWD II initial critical /essential requirements.
  - Develop technical integration requirements/plan to incorporate selected system into the Force XXI Battlespace Information Concept as a PEWD III P3I.
  - Complete PEWD II DT/OT as may be required.
  - Conduct a Milestone II decision.
- INTEGRATED COMMERCIAL INTRUSION DETECTION DEVICE (ICIDS) (.164 million)
- Conduct market surveillance supporting technology insertion.
- WATERSIDE SECURITY SYSTEM (WSS) (1.750 million)
- Develop a transportable low-cost version which includes assessment capabilities and low cost intrusion detection array.
- ELECTRONIC SECURITY SYSTEM (ESS) (1.450 million)
- Continue the low cost effort to evaluate and monitor the state-of-the-art of commercial off-the-shelf (COTS) electronic security sensors/systems commonly used at Navy facilities and ships.
  - Coordinate with Navy Sea Systems Command to introduce security technologies into the ship design process instead of retrofitting.

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APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D	

- Work with "Smart Ship" and "Smart Base" to interface ship security with base security systems.

## DoD LOCK PROGRAM (1.550 million)

- Continue development of a modular internal locking system (including boltwork designs) for use on conventional AA&E storage magazines
- Continue reviewing commercial practices of existing lock technologies and continue test and evaluation of replacement lock designs.
- Complete Security Seals project.
- Continue Physical Security Materials Study.
- Continue study of security materials.
- Complete interlocking device dual key development.
- Complete development of NSI User guidance software support package.

## ANTICOMPROMISE EMERGENCY DESTRUCT (AECD) (0.050 million)

- Continue with low cost sustained effort to assess state-of-the-art encryption techniques for the protection of data on Hard Disk Drives.
- Other issues to be resolved include but not limited to, protection of encryption key (s), level of encryption required for different applications.

TECHNOLOGY BASE (3.000 million) Complete and demonstrate prototype hardware for the improved laser diode, miniaturized radio frequency tags, the underwater security vehicle with acoustics guidance, and the acoustic detection and classification sensor systems. In addition, initiate projects to identify improved tactical sensors, thermal camouflage techniques, millimeter wave imaging to detect threats at distance of ten meters, a long range intruder equipment detection sensor, and smart shipping and storage container. If funds are adequate, initiate additional projects as identified by the Services.

(U) FY 1999 Plans:

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FORCE PROTECTION COMMERCIAL-OFF-THE-SHELF ASSESSMENTS (FP COTS) (13.100 million)

- Perform scheduled FY 1999 test and evaluations of selected COTS equipment/systems.
- Publish appropriate reports.
- Update a User's Guide of Commercially available Non Developmental Items for Force Protection uses.
- Update methodology and publish test and evaluation schedule for FY 2000.

TACTICAL AUTOMATED SECURITY SYSTEM TASS (1.390 million)

- Continue to investigate new COTS and developed security sensors.
- Integrate Automatic Alarm Assessment into TASS Annunciator to provide immediate visual assessment of alarms.

ADVANCED ENTRY CONTROL SYSTEM (AECS) (0.300 million)

- Investigate interface requirements for, and potential uses of, state of the art COTS security system components and sensors as part of the AECS baseline.

ADVANCED EXTERIOR SENSOR (AES) (2.835 million)

- Complete design, fabrication and Contractor Test and Evaluation of prototype system.

DELAY/DENIAL--SABER 203 (0.375 million)

- Complete QT&E and IOT&E on HALT (ESATA) system.
- Initiate Saber 203 system laser diode product improvement acquisition contract.

SECURITY ENHANCEMENT AND THREAT REDUCTION (SETR) (0.400 million)

- Continue Advanced Systems Concepts project.
- Integrate VMD products with annunciators and perimeter sensors to improve operator awareness.
- Test & Evaluate deployment ready AES VMD algorithm.

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MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - INTERIOR (MDARS-I) (2.961 million)

- Initiate and complete pre-planned product improvements (P3I) to develop capabilities which will satisfy the final phase requirements of the ORD.
- Award EMD contract.

MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - EXTERIOR (MDARS-E) (2.724 million)

- Deliver one (1) system to Aberdeen Test Center (ATC) to begin technical testing and training.
- Conduct a multi-unit early user appraisal at an operational site.
- Conduct the Milestone I/II In-Process Review (IPR) and award a competitive procurement with a production option.

HIGH VALUE ITEM SECURITY SYSTEM (HVISS) (0.176 million)

- Complete Milestone II requirements.
- Demonstrate system.

PLATOON EARLY WARNING DEVICE (PEWD II) (0.110 million)

- Perform system modifications according to Force XXI approved P3I.
- Conduct DT/OT on Enhanced PEWD II system.

INTEGRATED COMMERCIAL INTRUSION DETECTION DEVICE (ICIDS) (0.165 million)

- Conduct market surveillance supporting technology insertions.

WATERSIDE SECURITY SYSTEM (WSS) (1.600 million)

- Conduct Developmental/Operational Testing (DT/OT) of a transportable WSS with a remotely operated vehicle for assessment.
- Test the system at operational strategic submarine bases Bangor and Kings Bay.



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APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D	

ELECTRONIC SECURITY SYSTEMS (ESS) (1.500 million)

- Continue the ongoing low cost effort to evaluate and monitor the state-of-the-art of commercial off-the-shelf (COTS) electronic security sensors/systems commonly used at Navy facilities and ships.
- Coordinate with Navy Sea Systems Command to introduce security technologies into the ship design process instead of retrofitting.
- Work with "Smart Ship" and "Smart Base" to interface ship security with base security systems.

DoD LOCK PROGRAM (1.800 million)

- Continue development of a modular internal locking system (including boltwork designs) for use on conventional AA&E storage magazines
- Continue reviewing commercial practices of existing lock technologies and continue test and evaluation of replacement lock designs.
- Complete Security Seals project.
- Continue Physical Security Materials Study.

ANTICOMPROMISE EMERGENCY DESTRUCT (AECD) (0.100 million)

- Continue with low cost sustained effort to assess state-of-the-art encryption techniques for the protection of data on Hard Disk Drives.
- Other issues to be resolved include but not limited to, protection of encryption key (s), level of encryption required for different applications.

TECHNOLOGY BASE (3.000 million) Complete and demonstrate prototype hardware for the improved tactical sensors, thermal camouflage techniques, millimeter wave imaging device, long range intruder detection sensor, and a smart shipping and storage container. In addition, initiate additional projects as identified by the Services.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D	

**B. Program Change Summary (\$ million)**

Previous President's Budget	FY1996	FY1997	FY1998	FY1999	Total
Appropriated Value	19.299	18.676	18.558	19.588	Cost
Adjustments to Appropriated Value	19.299				Continuing
a. Congressionally Directed					
Undistributed Reduction	(0.203)	(0.478)			
b. Other		05.000	12.995	12.948	
Current Budget Submit/President's Budget	19.096	23.198	31.553	32.536	Continuing

**Change Summary Explanation:**

Funding: Funding changes are due to adjustments during the PBD process.  
 Schedule: N/A  
 Technical: N/A

**C. Other Program Funding Summary**

	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Compl	Cost
Procurement Line P-1 No(s)	- N/A									
Milcon Project No(s)	- N/A									
Related RDT&E:	- N/A									

**RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)**

DATE February 1997

APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 06032228D
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#### D. Schedule Profile

**Fiscal Year actual and planned events by quarter:**

	FY1996			FY1997			FY1998			FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	
<b>Acquisition</b>													
<b>Milestones</b>													
MDARS-I													
MDARS-E													
TASS													
SABER 203													
AES													
WSS													
<b>Engineering Milestones</b>													
N/A													
<b>T&amp;E Milestones</b>													
MDARS-I													
MDARS-E													
HVSS													
TASS													
SABER 203													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D	

Contract Milestones

N/A

Other Program Events

FY2000

- MDARS-I - MSIII
- AES - MS II
- DT&E/OT&E
- MDARS-E - MSIII
- AES - MS III

FY2001

FY2003

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE/PE NUMBER/ PROJECT NUMBER: PHYSICAL SECURITY EQUIPMENT PROGRAM/PE 0603228D/228D
RDT&E/BA 4		
A. Project Cost Breakdown (\$ in thousands)		
Project Categories	FY 96	FY 97
1. Primary Hardware Development	9,005	8,968
2. Development Support Equipment Acquisition	1,414	1,483
3. Software Development	1,135	1,119
4. Systems Engineering	1,330	1,020
5. Integrated Logistics Support (ILS)	436	476
6. Quality Assurance	85	100
7. Reliability, Maintainability & Availability	150	145
8. Configuration Management	250	280
9. Technical Data	300	441
10. Development Test & Evaluation	1,235	5,628
11. Operational Test & Evaluation	820	835
12. Program Management Support	1,905	1,964
13. Travel	279	294
14. Miscellaneous (less than 15%)	752	445
Total	19,096	23,198
B. Budget Acquisition History and Planning Information:		Not Applicable
	FY 98	FY 99
	9,420	9,772
	1,003	1,449
	966	1,001
	1,260	1,300
	381	411
	90	100
	145	160
	300	350
	300	450
	13,058	13,096
	740	750
	2,870	2,801
	311	296
	709	600
	31,553	32,536

R-1 SHOPPING LIST

R-1 ITEM NO.

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE
APPROPRIATION/BUDGET ACTIVITY										February 1997
RDT&E/BA 4										
C. Funding Profile Fiscal Year actual and planned obligations and expenditures										
Funds Profile	FY 96 Obs	FY 97 Obs	FY 98 Obs	FY 99 Obs	FY 96 Exp	FY 97 Exp	FY 98 Exp	FY 99 Exp	R-1 ITEM NOMENCLATURE/PE NUMBER/ PROJECT NUMBER PHYSICAL SECURITY EQUIPMENT PROGRAM/PE 0603228D/228D	
FY 1996 Q1	3,742				889					
FY 1996 Q2	8,210				3,115					
FY 1996 Q3	16,210				8,254					
FY 1996 Q4	18,667				14,002					
FY 1996 TOTAL	18,667				14,002					
FY 1997 Q1	19,096	3,551			16,703	1,080				
FY 1997 Q2		8,835			18,012	3,784				
FY 1997 Q3		15,743			19,096	10,027				
FY 1997 Q4		22,776				17,009				
FY 1997 TOTAL		22,776				21,373				
FY 1998 Q1		23,198				21,373	1,469			
FY 1998 Q2			5,684			23,198	5,147			
FY 1998 Q3			14,925				13,638			
FY 1998 Q4			26,596				23,136			
FY 1998 TOTAL			31,261				23,136			
FY 1999 Q1			31,261				27,599	1,515		
FY 1999 Q2			31,553				29,762	5,307		
FY 1999 Q3							31,553	14,063		
FY 1999 Q4								28,857		
FY 1999 TOTAL								28,857		
Total of FY	19,096	23,198	31,553	32,261	19,096	23,198	31,553	28,857		

R-1 SHOPPING LIST

R-1 ITEM NO.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)						DATE February 1997			
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide / BA-4			R-1 ITEM NOMENCLATURE Integrated Diagnostics 0603708D						
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete
P708 Integrated Diagnostics Demonstration	9.540	9.492	6.514	6.650	6.864	7.057	7.207	7.377	Continuing

## (U) A. Mission Description and Budget Item Justification

The program element provides funding for large scale, high leverage demonstrations of the integrated application of existing commercial and DoD technologies, practices, standards and products for order of magnitude weapon system affordability and support improvements. Demonstrations are selected to 1) measure the risks and show the feasibility of payoff from selected technology applications and 2) show novel or unorthodox alternatives to conventional weapon system acquisition and support. Demonstrations underway show technology applications which provide a highly integrated and automated set of weapon system support capabilities (built in test, factory, depot, and test equipment, technical information, etc.). The demonstrations are intended to lead to reduced maintenance manhours, "per weapon system" deployment tails, and weapon system acquisition and ownership costs. New demonstrations examine integrated acquisition processes and technology approaches to addressing systemic weapon system production and support affordability drivers. Demonstrations examine implementation risks and cross-phase impacts of alternative approaches to mitigate DoD imposed production and support business inefficiencies.

As preconditions to initiating a demonstration, Service managers commit to provide the R&D or procurement investment to transition the products to the selected demonstration field weapon system fleet and to incorporate products and concepts into new weapon systems designs for long-term payoffs. Generic products are migrated for DoD-wide use.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide / BA-4	R-1 ITEM NOMENCLATURE Integrated Diagnostics	0603708D

(U) A. Mission Description and Budget Item Justification (Continued)

Descriptions of the FY1996-FY1999 demonstrations:

The **Missile Integrated Diagnostics Demonstration** showed the feasibility of drastically reducing highly skilled military diagnostics technician support in the field with a contractor operated CONUS center utilizing remote diagnostics. This capability, a commercial innovation, was demonstrated on the Patriot missile system using existing satellite links. The Army plans to implement the diagnostics approach on the Patriot missile system and is evaluating its use for training enhancement.

The **Aviation Integrated Diagnostics Demonstration** showed integrated structural and electrical diagnostics and configuration control allowing commercially derived diagnostics products and electronic technical manuals. The demonstration showed increased aircraft availability by improving diagnostic accuracy while reducing maintenance manhours devoted to troubleshooting. The Navy plans to implement the system on the F/A-18 aircraft.

The **Joint Factory-to-Field Test Integration Demonstration** will establish definitions of key interfaces in automatic test systems (ATS) to establish a generic ATS open-systems architecture. The architecture will support joint-service test equipment interoperability and rehostability of test software on a variety of defense and commercial testers. Anticipated benefits include the ability to reapply factory test systems for field maintenance testing; improved interoperability among test systems; and continued support of legacy test systems in new test environments.

The **Trident Launcher Integrated Diagnostics Demonstration** will show the feasibility of using a real-time, shipboard monitoring and diagnostics system for the launcher subsystem. On-board monitoring will provide greater visibility of launch system readiness and reduce maintenance requirements. The demonstration system will outfit the launcher subsystem with new diagnostic sensors and processors linked together in an integrated network for real-time and off-board analysis substantially improving weapon system assurance, supporting failure "prediction" to reduce the potential for catastrophic failures, and reducing removals of still-good assets.



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<b>RD&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RD&E, Defense-wide / BA-4	R-1 ITEM NOMENCLATURE Integrated Diagnostics	0603708D

(U) A. Mission Description and Budget Item Justification (Continued)

The **Diagnostics for Acquisition Demonstration** will show the feasibility of using test methodologies to ensure purchases and repair returns of Commercial-Off-The-Shelf (COTS) products are compatible with an existing test hardware and software infrastructure. The demonstration will examine the use of test hardware and software to validate procurements for component procurements using performance specifications. Demonstrations include a series of in-use trials and off-weapon system diagnostics tests of a COTS aircraft flight control computer being considered for a variety of weapon system platforms.

The **Strategic System Critical Engineering Demonstration** will show feasibility of using a diagnostic approach for identifying and maintaining critical engineering knowledge needed for system integration of complex, strategic systems. Diagnostic data will be captured and system models will be developed to substitute for skill loss. Current strategic systems are supported through extended life-cycles without the benefit of product engineering historically retained by production programs. The project will identify critical and endangered skills needed for the Minuteman III program and codify the engineering knowledge to be used in system maintenance and diagnostics demonstrations.

The **Open Architecture Demonstration** will show the feasibility of establishing a common open-systems architecture for Integrated Diagnostics support approaches. Definitions of key interfaces for Integrated Diagnostics systems will be established to facilitate multi-Service logistical support interoperability and support multi-user applications such as industry/DoD and acquisition/field users.

**FY1996 Accomplishments** The six-month operational demonstrations for the missile and aviation diagnostic systems were completed and performance specifications were developed to introduce the demonstrated systems and concepts into normal operational use. Based on commercial test systems, key defense test interfaces were identified for the Factory-to-field Test Integration Demonstration.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide / BA-4	R-1 ITEM NOMENCLATURE Integrated Diagnostics	0603708D

**FY1997 Plans** Demonstrations of modified test equipment and test programs will be completed and additional instrument interfaces identified and demonstrated for the Factory-to-field Test System Demonstration. System hardware and software will be procured for the Trident Launcher Integrated Diagnostics Demonstration. COTS components will be procured for the Diagnostics for Acquisition Demonstration. Critical skill areas will be identified for the Strategic System Critical Engineering Knowledge Demonstration.

**FY1998 Plans** Open architecture interface standards will be demonstrated and coordinated for the Factory-to-field Test Integration Demonstration. Land-based hardware and software testing of the Trident Launcher Integrated Diagnostics Demonstration will be complete. Test hardware and software modifications will be completed for the Diagnostics for Acquisition Demonstration. Production and support engineering skills will be documented and modeled for the Strategic Systems Critical Engineering Demonstration. Candidate system architectures and potential interface standards for the Open Architecture Demonstration will be identified.

**FY1999 Plans** Systems architecture and interface specifications will be finalized for the Factory-to-field Test System Demonstration. At-sea testing of the Trident Launcher Integrated Diagnostics Demonstration will be complete. In-field demonstration of the COTS components diagnostics will be completed for the Diagnostics for Acquisition Demonstration. In-field demonstrations will be complete for the Strategic Systems Critical Engineering Demonstration. Critical interfaces and the system architecture definitions will be established for the Open Architecture Demonstration.

(U) B. Program Change Summary (\$M)	FY1996	FY1997	FY1998	FY1999	Total Cost
FY 1997 President's Budget					
Appropriated Value	9.861	9.742	6.537	6.682	Continuing
Adjustments to budget year since					
1997 President's budget	(.321)	(.250)	(.023)	(.032)	Continuing
FY 1998 President's Budget	9.540	9.492	6.514	6.650	Continuing

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide / BA-4	R-1 ITEM NOMENCLATURE Integrated Diagnostics 0603708D	

(U) C. Other Program Funding Summary

This Program funds Service managed demonstrations of technologies in the field environment to assess operational benefits. The Service managers are responsible for budgeting for any engineering and manufacturing development, Procurement, and MILCON necessary to transition the technologies to field use.

(U) D. Schedule Profile

Fiscal Year events by quarter:

	FY1996		FY1997		FY1998		FY1999
	1 2 3 4		1 2 3 4		1 2 3 4		1 2 3 4

**Missile Integrated Diagnostics Demonstration**

OCONUS demonstration complete x  
Develop system performance specifications x

**Aviation Integrated Diagnostics Demonstration**

Complete field demonstration x  
Develop system performance specifications x

**Joint Factory-to-Field Test Integration Demonstration**

Modify test hardware/software x  
Complete instrument interface demonstration x  
Complete test program interface demonstration x  
Coordinate technical open system architecture standards x

**Trident Launcher Integrated Diagnostics Demonstration**

Establish system, sensor, and software specifications x  
Conduct sensor and system software integration tests x  
Run benchmark tests and diagnostic checks for evaluation x  
Complete tests and document final report and assessments x

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide / BA-4	R-1 ITEM NOMENCLATURE Integrated Diagnostics	0603708D

Fiscal Year events by quarter:

FY1996	FY1997	FY1998	FY1999
1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

**Diagnostics for Acquisition Demonstration**

Identify and procure COTS components  
 Modify test hardware/software  
 Translate test strategy and rehost on legacy ATS  
 Complete field demonstration

**Strategic Systems Critical Engineering Demonstration**

Identify critical skill areas  
 Select knowledge capture & modeling approaches  
 Develop production/support engineering models  
 Demonstrate application in diagnostic environment

**Open Architecture Demonstration**

Document existing system architectures and interfaces  
 Develop critical interface definitions  
 Software modifications complete

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE
APPROPRIATION/BUDGET ACTIVITY		
RDT&E, Defensewide / BA-4		February 1997
R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER		Integrated Diagnostics/0603708D/P708
A. Project Cost Breakdown (\$ in Thousands)		
	FY1996	FY1997
System Specifications	621	900
Hardware Modification/Development	550	1,000
Software Modification/Development	2,894	2,740
System Integration	1,300	1,440
System Test (Dev. T&E)	400	700
System Demonstration (Op. T&E)	1,100	493
Engineering	1,986	1,944
Project Management	639	275
System Installation/Removal	50	0
Total	9,540	9,492
B. Budget Acquisition History and Planning Information		
	FY1998	FY1999
	500	750
	500	0
	1,000	1,000
	1,000	0
	1,412	400
	0	1,613
	1,602	1,880
	200	200
	300	807
	6,514	6,650
- Not Applicable -		

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER				February 1997			
RDT&E, Defensewide / BA-4				Integrated Diagnostics/0603708D/P708							
<b>C. Funding Profile</b>											
<b>Fiscal Year and planned obligations and expenditures (by quarter - \$ in thousands)</b>											
<b>Funds Profile</b>		<b>FY 1996 Obs</b>	<b>FY 1997 Obs</b>	<b>FY 1998 Obs</b>	<b>FY 1999 Obs</b>	<b>FY 1996 Exp</b>	<b>FY 1997 Exp</b>	<b>FY 1998 Exp</b>	<b>FY 1999 Exp</b>		
FY 1996 Q1	0					0					
FY 1996 Q2	5,716					300					
FY 1996 Q3	1,434					2,612					
FY 1996 Q4	956					2,804					
FY 1996 TOTAL	8,106					5,716					
FY 1997 Q1	956	0				2,390	0				
FY 1997 Q2	478	4,160				956	461				
FY 1997 Q3	0	2,897				478	1,948				
FY 1997 Q4	0	974				0	3,186				
FY 1997 TOTAL	1,434	8,031				3,824	5,595				
FY 1998 Q1		974	1,634				2,436	0			
FY 1998 Q2		487	2,265				974	980			
FY 1998 Q3		0	980				487	1,307			
FY 1998 Q4		0	654				0	1,612			
FY 1998 TOTAL		1,461	5,533				3,897	3,899			
FY 1999 Q1			654	1,670				1,634	0		
FY 1999 Q2			327	2,308				654	1,002		
FY 1999 Q3			0	1,002				327	1,336		
FY 1999 Q4			0	668				0	1,640		
FY 1999 TOTAL			981	5,648				2,615	3,978		
FY 2000 Q1				668					1,670		
FY 2000 Q2				334					668		
FY 2000 Q3				0					334		
FY 2000 Q4				0		6650			0		
FY 2000 TOTAL				1,002		9540		6514	2,672		
Total of fiscal year funds	9,540	9,492	6,514	6,650		9,540	9,492	6,514	6,650		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4					R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0603709D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	21.038	29.159	23.196	24.694	25.208	25.622	26.168	26.783	Continuing	Continuing
JRP-P709	21.038	29.159	23.196	24.694	25.208	25.622	26.168	26.783	Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT: This program is a budget activity level 4 based on the demonstration/validation activities ongoing within the program. This PE was established in response to Congressional guidance to consolidate DoD robotics programs on unmanned ground systems and related robotics technologies in order to increase focus of the Services' robotics programs on operational requirements. The program will demonstrate maturity of robotics technologies for their application to the formal acquisition process of land systems and subsystems. Emphasis is on the development of robotics technologies that: are amenable to multi-service applications; provide capability in high hazard environments; provide improved battlefield efficiency using supervised autonomous operational capability; reduce or enhance force manpower and support; and are affordable. This PE consolidates the DoD robotics program for unmanned ground vehicles (UGV) into two activities: (1) advancement of UGV concepts into EMD acquisition projects and (2) enhancement and exploitation of critical robotics technologies for today's and future UGV acquisition requirements. UGV projects under this PE are: (1) the Tactical Unmanned Vehicle (TUV) - a joint Army/USMC effort to develop a telerobotic UGV for the Reconnaissance, Surveillance and Target Acquisition (RSTA) mission, scheduled to go into EMD in 1999; (2) the Robotics Excavation Vehicle System (REVS) - a USAF effort to develop a robotics/autonomous vehicle capability for area clearance. This technology can also be applied to formerly used defense sites for cleanup/disposal; (3) the Remote Ordnance Neutralization System (RONS) - a Navy effort to develop an ordnance neutralization system that performs Explosive Ordnance Disposal (EOD) tasks robotically and by teleoperation in chemical, radiation and explosive environments; (4) the Vehicle Teleoperation Capability (VTC) - a generic, modular set of kits that can be used to retrofit several different types of currently fielded Engineer vehicles to allow remote obstacle breaching operations (minefields, earthworks, bunkers, etc.); and a (5) Basic Unexploded Ordnance [UXO] Gathering System (BUGS) - a Joint Service EOD effort to develop a system

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that will safely clear unexploded improved conventional munitions (ICM) from the surface of large areas. BUGS consists of an autonomous or semiautonomous sensor platform to localize the ICMs and several small expendable autonomous vehicles that use the location data to proceed to the area and perform the required mission.

## (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

### (U) FY 1996 Accomplishments:

Conducted General Officers' Steering Committee (GOSC) for the Joint Robotics Program which established Program Guidance for the near and far term. (N/A)

#### TACTICAL UNMANNED VEHICLE (TUV) (6.831 million)

- Demonstrated SARGE, User Appraisal (UA) prototypes, at Association of United States Army (AUSA) and completed fabrications of SARGE UA assets.
- Passed Milestone I and entered into Program Definition and Risk Reduction Phase (PDRR).
- Achieved favorable decision from Director, Combat Developments, Ft Benning, GA and Forces Command to conduct User Appraisal with 3BDE, 3ID (Mech).
- Conducted baseline Concept of Employment Analysis for the TUV at Ft Benning, GA.
- Initiated Integrated Product Team (IPT) effort for development of TUV specifications.
- Completed SARGE prototype testing at Aberdeen Proving Ground, MD.

#### VEHICLE TELEOPERATION CAPABILITY (VTC) (4.539 million)

- Supplied Standardized Teleoperation System kits to 1st Armored Division, Bosnia in support of countermine operations for Operation Joint Endeavor.
- Transitioned STS kits, with continuing support to 1st Infantry Division in Operation Joint Endeavor.
- Passed Milestone 0.
- Initiated Integrated Product Team (IPT) effort for development of VTC specifications.

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- Provided teleoperated HMMWVs for the vehicle mine mounted detection program.
- Continued support of the Joint Amphibious Mine Countermeasures (JAMC) and Off Route Smart Mine Clearance (ORSMC) programs.

## UNMANNED GROUND VEHICLE ARCHITECTURAL DEVELOPMENT (0.313 million)

- Implemented and managed the Joint Architecture for Unmanned Ground Systems (JAUGS) initiative throughout the UGV community.

## REMOTE ORDNANCE NEUTRALIZATION SYSTEM (RONS) (0.400 million)

- Obtained Milestone II decision approval and began Engineering and Manufacturing Development (EMD).

## ROBOTIC EXCAVATION VEHICLE SYSTEM (REVS) (2.500 million)

- Supported Air Force users (Civil engineering squadron commander at Nellis AFB, NV and Warner-Robins Air Logistics Center, GA) in developing Mission Need Statements (MNS) and other requirement documents for robotics systems.
- Laid the groundwork for combining all USAF ground robotics development at one location.
- Conducted cost/benefit analysis using DoD-approved Remedial Action Cost Engineering and Requirements (RACER) model.
- Completed FY96 UXO Clearance Master Plan for the Army Environmental Center.
- Completed planning for AOE enhancements and technology transfer package. Controller area network (CAN) system installed and tested.
- Supported advanced technology demonstrations of robotics UXO characterization and clearance systems at live sites at O'Hare Field, IL, and Richard-Gebaur Air Reserve Base, MO.
- Continued with integration of Jet Propulsion Lab obstacle avoidance system onto Subsurface Ordnance Characterization System (SOCS).
- Completed memorandum of understanding (MOU) with operational EOD unit at Eglin AFB, FL.
- Conducted explosive tests assessing Surface Munitions Clearance System (SMCS) survivability.

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- Successfully demonstrated prototype of vehicle teleoperation capability (VTC) coupled with navigation/mapping system at Joint Amphibious Mine Countermeasures (JAMC) Advanced Technology Demonstration (ATD).

TECHNOLOGY BASE (6.455 million) Conducted major UGV Technology Demonstration (DEMO II) at Fort Hood, TX. This demonstration focused upon autonomous and semi-autonomous capability (especially in the areas of navigation and mission planning modules) for off-road operation. As part of training exercises, three cooperatively operating vehicles were successfully employed by Army operational units to examine capabilities of UGVs conducting Reconnaissance, Surveillance, and Target Acquisition (RSTA) activities to augment scout forces in three tactical scenarios: (1) Forward Observer (FO), (2) Military Operations in Urban Terrain (MOUT), and (3) Reconnaissance/Security (conducted as an Army Battle Lab Warfighting Experiment). Demonstrated the (1) ability of multiple vehicles to perform coordinated tactical maneuvers for ranges in excess of 3 KM, (2) and the ability of UGVs to identify targets, call for and adjust fires.

## (U) FY 1997 Plans:

### TACTICAL UNMANNED VEHICLE (TUV) (14.412 million)

- Begin utilizing IPT development approach of producing specifications and contract requirements package for the Engineering and Manufacturing Development (EMD) Request for Proposal (RFP).
- Conduct TUV leadership training.
- Integrate SARGE UA assets into 3BDE, 3ID (Mech) and conduct six months training for National Training Center (NTC) rotation at Fort Irwin, CA.
- Complete COEA study plan and initiate S&A and milestones to facilitate feedback to IPT specification development and ORD update.
- Provide UGV prototypes to support USMC Commandant's Warfighting Laboratory Limited Objective Experiment at Camp Pendleton, CA.

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- Evaluate the mobility of existing ground vehicle platforms, such as the Mobile Detection Assess Response - Exterior (MDARS-E) platform for possible TUV variant alternatives.

## VEHICLE TELEOPERATIONS CAPABILITY (VTC) (4.913 million)

- Continue to support Surrogate Teleoperation System (STS) operated countermine systems in Bosnia.
- Continue VTC development testing using a variety of platforms (D7G bulldozer, M-1, and HMMWV).
- Pass Milestone I/II and award Phase III Small Business Innovative Research (SBIR) effort to support PDRR.
- Provide VTC kits for the Interim Vehicle Mounted Mine Detector program.

## UNMANNED GROUND VEHICLE ARCHITECTURAL DEVELOPMENT (0.234 million)

- Continue management of JAUGS initiative using Joint Technical Architecture (JTA) guidelines throughout UGV community.
- Continue protocols and standards effort.

## REMOTE ORDNANCE NEUTRALIZATION SYSTEM (RONS) (0.400 million)

- Integrate RONS automated functions into the RECORD system and conduct a demonstration.

## ROBOTIC EXCAVATION VEHICLE SYSTEM (REVS) (3.500 million)

- Transfer supervised autonomous technology to AOE platform.
- Demonstrate supervised autonomous operation of AOE at JPG-IV.
- Demonstrate initial prototype of surface munitions clearing system (SMCS) at Nellis AFB Range Complex in Dec 96.
- Transfer navigation and mapping system from REVS to SMCS.
- Demonstrate nighttime operations of the SMCS at Nellis AFB Range Complex in July 97.
- Complete Technology Transfer package of low-cost Controller Area Network system.
- Complete integration of JPL/Demo-II obstacle avoidance system aboard SOCS.

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- Demonstrate standard teleoperation system at countermine ACTD for JAMC.
- Conduct preliminary working group meeting with Japan Defense Agency for join project in area clearance technologies.
- Complete cooperative research and development agreement with Lockheed Martin/Baltimore, MD.
- Initiate cooperative research and development agreement with Caterpillar, Inc.

## TECHNOLOGY BASE (5.700 million)

- Further pursue obstacle detection improvements to include countering holes and wire.
- Pursue limited night operations mobility and RSTA.
- Achieve RSTA functions at tactically realistic ranges.
- Improve mission planner/man-machine interface.
- Transition DEMO II technology and components to Project Manager, Unmanned Ground Vehicles.
- Integrate above payload/navigation technologies onto a HMMWV platform.
- Initiate new platform evaluations through simulations/testing.
- Initiate integration of advanced technologies onto smaller, 2000lb class demonstration platform.

## (U) FY 1998 Plans:

### TACTICAL UNMANNED VEHICLE (TUV) (12.299 million)

- Prepare Milestone II documentation package to support decision to enter into EMD.
- Finalize TUV EMD RFP and release to industry.
- Conduct source selection.
- Continue long-term UA in support of an Evolutionary Acquisition Strategy.

### VEHICLE TELEOPERATIONS CAPABILITY (VTC) (2.622 million)

- Continue VTC development testing using a variety of test platforms (D7G bulldozer, M-1, and HMMWV).

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- Participate in ATDs in preparation for the Mine/Countermine Top Level Demonstration.
  - Pass Milestone III and award production options to support VTC kit requirements.
  - Deliver VTC EMD systems.
  - Continue support for Operation Joint Endeavor (Bosnia).
- UNMANNED GROUND VEHICLE ARCHITECTURAL DEVELOPMENT (0.175 million)
- Continue management of the JAUGS initiative using Joint Technical Architecture (JTA) throughout the UGV community.
- BASIC UNEXPLODED ORDNANCE [UXO] GATHERING SYSTEM (BUGS) (0.600 million)
- Initiate sensor platform/basic UXO gatherer (BUG) integration.
- ROBOTIC EXCAVATION VEHICLE SYSTEM (REVS) (3.500 million)
- Continue development of autonomous REVS components, transfer technology to industry and support Live Site Demonstrations
  - Continue development of SMCS systems, to include remote manipulation and handling of UXO.
  - Continue development of robotic construction vehicles for unmanned mine countermeasures operations.
  - Begin development of UXO clearance robotic logistical vehicle (RLV).
  - Secure Nunn funding and initiate joint project with the JDA for rough terrain area clearance.
- TECHNOLOGY BASE (4.000 million)
- Fully integrate Laser Radar (LADAR) with dual focal length stereo for high tempo day/night operations.
  - Pursue autonavigation model based vision for improved on-off road robustness.
  - Complete integration of advanced technologies onto demonstration platforms, deliver two prototypes.
  - Initiate development of Second Generation User Appraisal Vehicle.

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(U) FY 1999 Plans:

TACTICAL UNMANNED VEHICLE (TUV) (13.120 million)

- Award EMD contract.
- Identify/evaluate maturing technologies for insertion into TUV P3I program.
- Continue long-term UA and demonstrations.

VEHICLE TELEOPERATIONS CAPABILITY (VTC) (2.694 million)

- Participate in ATDs in preparation for the Mine/Countermine Top Level Demonstration.
- Initiate development of follow-on VTC applications.

UNMANNED GROUND VEHICLE ARCHITECTURAL DEVELOPMENT (0.180 million)

- Continue management of the JAUGS initiative using the Joint Technical Architecture (JTA) throughout the UGV community.

BASIC UNEXPLODED ORDNANCE [UXO] GATHERING SYSTEM (BUGS) (1.200 million)

- Initiate sensor platform/BUG testing.
- Initiate BUGS analysis of alternatives and obtain Milestone 0.

ROBOTIC EXCAVATION VEHICLE SYSTEM (REVS) (3.500 million)

- Transfer REV & SOCV technology packets to industry.
- Continue development of REV & ASAV technology for fully autonomous operation.

TECHNOLOGY BASE (4.000 million)

- Conduct Battle Lab Warfighting Experiment (BLWE) to provide initial operational evaluation of smaller advanced unmanned ground vehicles.
- Pursue UGV Control Station which is compatible with the new Force XXI architecture.
- Achieve advanced mobility enhancements for new platform.

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- Initiate a pre-Advanced Concepts Technology Development (ACTD) Second Generation User Appraisal Vehicle for MOUT, Scouts, and other missions.
- Deliver first prototype of Second Generation User Appraisal Vehicle.

B. Program Change Summary (\$ million)	FY1996	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget Appropriated Value	21.566	23.744	24.273	24.810	Cont.
Adjustments to Appropriated Value	21.566				
a. Congressionally Directed Undistributed Reduction	(0.528)	(0.610)	(0.077)	(0.116)	
b. Congressionally Directed Addition		05.000			
c. OSD Internal Reprogramming Actions			(1.000)		
Current Budget Submit/President's Budget	21.038	28.134	23.196	24.694	Cont.

Change Summary Explanation:

Funding: Funding changes are due to adjustments during the POM development process.  
 Schedule: N/A  
 Technical: N/A

C. Other Program Funding Summary

	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Compl	Cost
Procurement Line P-1 No(s)	- N/A									
Milcon Project No(s)	- N/A									
Related RDT&E:	- N/A									

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**Fiscal Year actual and planned events by quarter:**

	FY1996	FY1997	FY1998	FY1999
<b>Acquisition Milestones</b>				
TUV				
VTC				
RONS				
BUGS				
REVS/SOCV				

## Milestones

DEMO II

## Milestones

TUV	USER EVALUATIONS		
VTC		DT&E	
RONs	DT&E	DT&E/OT&E	
BUGS			
tract Milestones			DT&E
N/A			



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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE/PE NUMBER/ PROJECT NUMBER: JOINT ROBOTICS PROGRAM/PE 0603709D/709D
RDT&E/BA 4		
A. <u>Project Cost Breakdown</u> (\$ in thousands)		
Project Categories	FY 96	FY 97
1. Primary Hardware Development	10,473	15,647
2. Development Support Equipment Acquisition	270	320
3. Software Development	3,888	5,771
4. Systems Engineering	1,820	2,511
5. Integrated Logistics Support (ILS)	349	381
6. Quality Assurance	284	381
7. Reliability, Maintainability & Availability	102	94
8. Configuration Management	90	143
9. Technical Data	150	270
10. Development Test & Evaluation	849	949
11. Operational Test & Evaluation	30	60
12. Program Management Support	1,426	1,286
13. Travel	372	562
14. Miscellaneous (less than 15%)	935	784
Total	21,038	29,159
B. <u>Budget Acquisition History and Planning Information:</u> Not Applicable		
	FY 98	FY 99
	11,073	12,221
	400	500
	3,229	3,169
	2,424	2,404
	634	754
	564	579
	121	124
	167	169
	200	200
	1,376	1,411
	60	60
	1,744	1,784
	468	473
	736	846
	23,196	24,694

R-1 SHOPPING LIST

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE			
APPROPRIATION/BUDGET ACTIVITY					February 1997			
RDT&E/BA 4					R-1 ITEM NOMENCLATURE/PE NUMBER/ PROJECT NUMBER JOINT ROBOTICS PROGRAM/PE 0603709D/709D			
C. Funding Profile Fiscal Year actual and planned obligations and expenditures								
Funds Profile	FY 96 Obs	FY 97 Obs	FY 98 Obs	FY 99 Obs	FY 96 Exp	FY 97 Exp	FY 98 Exp	FY 99 Exp
FY 1996 Q1	6,960				3,340			
FY 1996 Q2	11,280				7,060			
FY 1996 Q3	18,100				12,780			
FY 1996 Q4	21,038				19,500			
FY 1996 TOTAL	21,038				19,500			
FY 1997 Q1		9,646			21,038	4,630		
FY 1997 Q2		15,635				9,786		
FY 1997 Q3		25,085				17,714		
FY 1997 Q4		29,159				24,604		
FY 1997 TOTAL		29,159				24,604		
FY 1998 Q1			7,679			27,027	3,684	
FY 1998 Q2			12,438			29,159	7,785	
FY 1998 Q3			19,956				14,092	
FY 1998 Q4			23,196				19,573	
FY 1998 TOTAL			23,196				19,753	
FY 1999 Q1				8,168			21,500	3,921
FY 1999 Q2				13,240			23,196	8,287
FY 1999 Q3				21,244				15,002
FY 1999 Q4				24,694				20,837
FY 1999 TOTAL				24,694				20,837
Total of FY	21,038	29,159	23,196	24,694	21,038	29,159	23,196	20,837

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM					
RDT&E/BA 4					ADVANCED SENSOR APPLICATIONS PROGRAM PE 0603714D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	24.539	24.937	15.379	15.744	16.690	17.384	17.756	18.173	Continuing	Continuing
Project Name/No. and Subtotal Cost ASAP/P714	24.539	24.937	15.379	15.744	16.690	17.384	17.756	18.173	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

**Brief Description of Element:** This program focuses on continued development of nonacoustic anti-submarine warfare (ASW) technology that has demonstrated potential for improvements in U.S. ASW capabilities in the near term. NOTE: Prior to FY 1993, this program was called the NAASW program.

**Program Accomplishments and Plans:**

FY 1996 Accomplishments:

- Continued hydrodynamic modeling and laboratory sensor testing (3.6 Million)
- Continued joint US/UK testing and evaluation (12.2 Million)
- Continued joint US/Norwegian system testing and data collection (4.1 Million)
- Continued validation/modeling and theoretical analysis (4.6 Million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 4	R-1 ITEM ADVANCED SENSOR APPLICATIONS PROGRAM PE 0603714D	

FY 1997:

- Continue joint US/Norwegian test (4.3 Million)
- Continue joint US/UK test (4.0 Million)
- Continue joint US/German data analysis (2.7 Million)
- Joint US/Russian undersea experiments (4.1 Million)
- Continue validation/modeling and theoretical analysis (9.6 Million)
- Contribution to SBIR fund (\$0.2 Million)

FY 1998:

- Continue Russian activities - complete initial sensor evaluation (1.1 Million)
- Continue upgrades to airborne RAR/SAR (1.7 Million)
- Continue joint US/German test activity (2.0 Million)
- Continue joint US/UK test activity (4.1 Million)
- Continue validation/modeling and theoretical analysis (3.3 Million)
- Complete and test LIDAR system (3.2 Million)

FY 1999:

- Continue Russian activities - complete initial sensor evaluation (1.1 Million)
- Continue upgrades to airborne RAR/SAR (1.7 Million)
- Continue joint US/German test activity (2.0 Million)
- Continue joint US/UK test activity (4.1 Million)
- Continue validation/modeling and theoretical analysis (3.3 Million)
- Complete and test LIDAR system (3.5 Million)

The ASAP program is in Budget Activity 4, Demonstration and Validation. The program will continue in the dem/val phase of development through FY 1996.

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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R-1 ITEM

ADVANCED SENSOR APPLICATIONS PROGRAM  
PE 0603714D**B. Program Change Summary**

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	Total Cost
FY 1997 President's Budget	24.900	24.001	15.433	15.821	Continuing
Appropriated Value	24.900	25.501			
Adjustments to Appropriated Value	(.361)	(.564)	(.054)	(.077)	
FY 1998 President's Budget Request	24.539	24.937	15.379	15.744	Continuing

## Change Summary Explanation:

Funding: Not Applicable  
Schedule: Not Applicable  
Technical: Not Applicable

**C. Other Program Funding Summary Cost:** None**D. Schedule Profile**

Joint US/Norwegian test  
Joint US/UK exercise  
Joint US/German test  
Joint US/Russian undersea experiments  
Joint US/UK at-sea data collection  
Joint US/UK at-sea data collection  
At-sea LIDAR system evaluation  
Joint US/German shallow water data collection  
Russian sensor evaluation

1QFY96  
2QFY96  
4QFY96  
1QFY97  
3QFY97  
2QFY98  
3QFY98  
4QFY98  
4QFY98

Fiscal Year actual and planned events by quarter. Not Applicable

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APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 4	R-1 ITEM ADVANCED SENSOR APPLICATIONS PROGRAM PE 0603714D	

1	2	<u>FY1996</u> 3	4	1	<u>FY1997</u> 3	4	1	<u>FY1998</u> 3	4	1	<u>FY1999</u> 3	4
Acquisition Milestones			Not Applicable									
Engineering Milestones			Not Applicable									
T&E Milestones			Not Applicable									
Contract Milestones			Not Applicable									
Other Program Events			Not Applicable									

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE February 1997	
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM	
RDT&E/BA 4		ADVANCED SENSOR APPLICATIONS PROGRAM/PE 0603714D	
A. Project Cost Breakdown		FY 1996	FY 1997
Project Categories		FY 1998	FY 1999
a. Salaries/Benefits			
b. Primary Hardware Development			
c. Ancillary Hardware Development			
d. Development Support Equipment Acquisition			
e. Research Support Equipment Acquisition			
f. Software Development			
g. Licenses			
h. Systems Engineering			
i. Training Development			
j. Integrated Logistics Support			
k. Quality Assurance			
l. Reliability, Maintainability & Availability			
m. Configuration Management			
n. Technical Data			
o. Development Test & Evaluation			
p. Operational Test & Evaluation			
q. Contractor Engineering Support			
r. Government Engineering Support			
s. Program Management Support			
t. Program Management Personnel			
u. Travel			
v. Research Personnel			
w. Miscellaneous (less than 15%)			
Total			

R-1 SHOPPING LIST

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	
APPROPRIATION/BUDGET ACTIVITY										R-1 ITEM	
RDT&E/BA 4										ADVANCED SENSOR APPLICATIONS PROGRAM 0603714D	
B. Budget Acquisition History and Planning Information											
Performing Organizations											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity	Project Office BAC	Total Prior to FY	FY 1996	FY 1997	FY 1998	FY 1999	Budget to Complete	Total Program
Product Development Organization											
Support and Management Organizations											
Test and Evaluation Organizations											
Government Furnished Property											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity	Project Office BAC	Total Prior to FY	FY 1996	FY 1997	FY 1998	FY 1999	Budget to Complete	Total Program
Product Development Property											

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE
APPROPRIATION/BUDGET ACTIVITY		February 1997
RDT&E/BA 4	R-1 ITEM ADVANCED SENSOR APPLICATIONS PROGRAM 0603714D	
Support and Management Property		
Test and Evaluation Property		
Subtotal Product Development		
Subtotal Support and Management		
Subtotal Test and Evaluation		
Total Project (should match fiscal resources shown on the R-2 for the project)		

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE
APPROPRIATION/BUDGET ACTIVITY			R-1 ITEM	February 1997
RDT&E/BA 4			ADVANCED SENSOR APPLICATIONS PROGRAM 0603714D	
C. <u>Funding Profile</u> Fiscal Year actual and planned obligations.				
	FY 1996	FY 1997	FY 1998	FY 1999
Funds Profile				
PYQ1	13,537			
PYQ2	8,917			
PYQ3	2,085			
PYQ4				
PYTot	24,539			
CYQ1		16,882		
CYQ2		7,119		
CYQ3		936		
CYQ4				
CYTot		24,937		
BY1Q1			11,050	
BY1Q2			4,329	
BY1Q3				
BY1Q4				
BY1Tot			15,379	
BY2Q1				11,000
BY2Q2				4,744
BY2Q3				
BY2Q4				
BY2Tot				15,744
BY2+1Q1				
BY2+1Q2				
BY2+1Q3				
BY2+1Q4				
BY2+1Tot				
Total FY	24,539	24,937	15,379	15,744

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/Budget Activity 4*					R-1 ITEM NOMENCLATURE CALS, The Strategy - PE 0603736D						
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	24.476	15.527	1.916	1.899	1.881	1.857	1.896	1.941	Continuing	Continuing	
Specific Emitter Identification /P457	24.476	15.527	1.916	1.899	1.881	1.857	1.896	1.941	Continuing	Continuing	

\*BA 3 for FY1995 and FY 1996. Changed to BA 4 in FY 1997. PE is the same.

**(U) A. Mission Description and Budget Item Justification**

**(U) BRIEF DESCRIPTION OF ELEMENT:** CALS is an international core strategy to share integrated digital product data through a set of standards to achieve efficiencies in business and operational mission areas. DoD's overarching goal in CALS is to develop a seamless defense enterprise in which the knowledge products of the acquisition process are immediately and rapidly accessible to all authorized users while maintaining near immediate currency and quality of information. This desired state is referred to as the "Integrated Data Environment (IDE)". The IDE (immediate access to quality information) drives many defense-wide and functional-specific reforms and business process improvements. The rapid sharing of information is an implied requisite of Integrated Product and Process Teams, a fundamental process for implementing concurrent engineering and streamlining project management. Digitized information frees logistic support and operator personnel from the burden of cumbersome document or file formats for information processing or presentation - enabling new methods for the performance of maintenance and training tasks based on interactive electronic technologies. This program element is to (1) assess and transition evolving automation technologies into the CALS strategy; (2) develop, maintain and apply to weapon system program office operations an executable business model for the application of CALS and related technologies; (3) integrate technical and functional requirements into a Shared Information Framework (SIF) of the standards, protocols, procedures, and network management conventions required to achieve compatible implementation of the IDE throughout the international defense enterprise.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/Budget Activity 4	R-1 ITEM NOMENCLATURE CALS, The Strategy - PE 0603736D	

**PROGRAM ACCOMPLISHMENTS AND PLANS:**

- (U) FY 1996 Accomplishments:
- Partially funded the Joint Defense Total Asset Visibility (DTAV) Office to cover aspects of JTAV research and development in support of peacekeeping contingency operations in Bosnia (\$3 Million).
  - Partially funded the Defense Science Board task on Logistics Modernization to finish efforts begun in FY95 to reduce the cost of ownership of weapon systems through logistics modernization (\$.075 Million).
  - Develop Privatization initiative via CALS technology and identify requirements for weapon system shared information. Identify Functional Economic Analyses processes for CALS applications (\$.276 Million).
  - Partially funded the CALS Thrust Teams in support of Business Process Improvements using CALS digital technology (\$2.125 Million).
  - Funded efforts to further the development of IWSDB and RAMP technology (\$19.0 Million).

(U) Documentation includes: Analyses of technologies for representing products during the design and acquisition phases which can be translated into the reverse engineering phases of the weapon system life cycle; investigation of techniques for capturing design knowledge-base used for development of software; identification and analysis of technologies and capabilities which might provide structure and guidance for identifying knowledge-base and meta-knowledge update needs; enhancing simulation and modeling techniques for identifying linkages and dependencies among devices, and the interplay between hardware and software.

- (U) FY 1997 Plans:
- Develop CALS Thrust Teams' initiatives for Business Process Improvements (BPI) using CALS technology. Areas of focus will be on identifying and implementing BPI concepts within the Integrated Data Environment (\$1.000 Million).
  - Support a Weapon System Program's development of an IDE (\$.500 Million).
  - Continue to develop analysis tools and methods to support the IDE implementations (\$.527 Million)
  - Continue to develop and deploy RAMP and IWSDB technology (13.5 Million).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/Budget Activity 4	R-1 ITEM NOMENCLATURE CALS, The Strategy - PE 0603736D	

(U) FY 1998 Plans:

- Continue supporting the CALS Thrust Teams' initiatives for Business Process Improvements (BPI) using CALS technology. Areas of focus will be on identifying and implementing BPI concepts within the Integrated Data Environment. (\$1.000 Million)
- Support a Weapon System Program's development of an IDE (\$.500 Million)
- Continue development of Object Oriented analysis tools and methods to support the IDE implementations (\$.416 Million)

(U) FY 1999 Plans:

- Continue implementing BPI concepts within the Integrated Data Environment. (\$1.000 Million)
- Support a Weapon System Program's development of an IDE (\$.500 Million)
- Continue development of analysis tools and methods to support the IDE implementations (\$.399 Million)

(U) B. Program Change Summary

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>Total Cost</u>
Previous President's Budget	5.789	1.936	1.922	1.908	Continuing
Appropriated Value	25.745	15.936			

Adjustments to Appropriated Value

- Congressionally-directed undistributed reduction (1.269) (.409)
- Other (DoD Program Changes) (.006) (.009)

Current Budget Submit /President's Budget	24.476	15.527	1.916	1.899	Continuing
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/Budget Activity 4	R-1 ITEM NOMENCLATURE CALS, The Strategy -	PE 0603736D

(U) Change Summary Explanation:

(U) Funding: The changes in FYs 1996 and 1997 are due to Congressional undistributed reductions, proposed recissions, program budget adjustments, and amended fiscal guidance.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

(U) C. Other Program Funding Summary Not Applicable

(U) D. Schedule Profile Not Applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-3 Exhibit)		DATE	February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	
RDT&E, Defense Wide/Budget Activity 4		CALS, The Strategy - PE 063736D	

(U) A. Project Cost Breakdown (in Millions)

Systems Engineering	FY 1996	FY 1997	FY 1998	FY 1999
Training Development	7.331	7.027	0.416	0.399
Integrated Logistics Support	0.325	0.250	0.250	0.250
Configuration Management	6.549	0.250	0.250	0.250
Technical Data	0.257	0.250	0.250	
Contractor Engineering Support	0.528			0.250
Research Personnel	0.415			
Miscellaneous (less than 15% of total)	2.266			
Business Process Improvements	0.200			
TOTAL	6.605	7.750	0.750	0.750
	24.476	15.527	1.916	1.899

(U) B. Budget Acquisition History and Planning Information

Not Applicable

(U) C. Funding Profile

Not Applicable

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE  
February 1997APPROPRIATION/BUDGET ACTIVITY Research,  
Development, Test and Evaluation, Defense-  
wide /BA 4R-1 ITEM NOMENCLATURE  
NATO Cooperative R&D  
PE 0603790D

COST (In Millions)	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	29 278	21 840	9 744	13 584	11 262	12 307	11 840	12 309	12 814	Continuing	Continuing
P790-NATO Cooperative R&D	29 278	21 840	9 744	13 584	11 262	12 307	11 840	12 309	12 814	Continuing	Continuing

## A. Mission Description and Budget Item Justification

These funds will be used by the Services and Defense Agencies to initiate international cooperative research and development programs with the NATO and major non-NATO allies. The program implements the provisions of Title 10 U.S. Code, Section 2350a. The purpose of the program is to improve the defense acquisition system by sharing technology and jointly developing military equipment with our allies. This will also improve operational efforts by improving interoperability through use of similar equipment and improved interfaces.

The program is designed to provide "Venture Capital" to the services/agencies. The program is implemented by the services/agencies submission of candidate projects that will take advantage of international cooperative to jointly fulfill military requirements. Candidates are reviewed and approved by the USD(A&T). The services/agencies will complete an international agreement with an ally that fully defines the project responsibilities and objectives prior to release of funds. The funds are used to support all associated R&D costs including the identification of cooperative opportunities and administration of the program. The planned program is shown below. The final program will be reported separately as required by 10USC2350a(f).

**FY1996 Accomplishments**

This project is providing funding for cooperative opportunities that are managed by the services. All of these have approved international agreements which define the responsibilities of each country. The USD(A&T) provided approval of each effort as having an important military need. These include Adaptive Beamforming(1) BIP(1.12) Biological Chemical Detector(0.5), Composite Hull(0.4) Computer codes for Predicting explosions(0.65) Advanced Steels(1) SAR(1) EAOC(1.0) VISTA Warrior (1.0)CONDOR(1.0), Continuous Processing of Composite Propellants (0.6), ICR Turbine(1.77), IIR(1.0),DASS(1.0),Fight Vehicle Propulsion(1) Hawk Fire Detection(1.3) High Tech Switch(0.5), Extended Air Defense(0.8), RADEOS(2), and Space Module(2) (\$21.84) million)

<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY Research, Development, Test and Evaluation, Defense-wide/BA 4	R-1 ITEM NOMENCLATURE NATO Cooperative R&D PE 0603790D	

**FY1997 Plans**

Funds efforts begun in earlier years and some new concepts. These include: Effects of Ionosphere on C&S Systems(0.1), ASCA (0.25), RADEOS (.6), Space Module(.75), Combat ID(.8) Eye-safe Laser (1), Focal Plane Array (.5) HAWK Fire Direction Center (2.6) Short Range Missile(0.25), Trimaran Hull(.25) SOFTWARE TOOLS(0.25), MULTI-SERVICE TRANSPORT(.75) UUV(.25), R/SAOC (1.35) (Total \$9.744)

**FY1998 Plans**

Funds new projects that will be identified by the military laboratories and approved by the USD(A&T) to take advantage of cooperative opportunities to reduce cost, maximize use of allied technology and improve interoperability.

**FY 1999 Plans**

Continues to initiate new projects that will be followed up by Service funding from the associated Service NATO Cooperative R&D PE.

**B. Program Change Summary**

	FY1996	FY1997	FY1998	FY1999
Previous President's Budget	45.642	23.500	13.748	11.267
Appropriated Value	23.500	10.000		
Adjustments to Appropriated Value/President's Budget	-1.660	-0.256	-0.004	-0.005
Current Budget Submit	21.840	9.744	13.744	11.262

Change Summary Explanation:  
 Funding: FY 1996 change is the result of undistributed congressional reductions. FY 1997 reduction to fund service-unique NATO Cooperative R&D program  
 Schedule: No Change  
 Technical: No Change

**C. Other Program Funding Summary**

	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Total Cost
Procurement Line P-1 No(s): N/A									
Related RDT&E:									
0603790A	0	9.755	13.168	11.169	11.260	11.860	12.032	12.246	Cont.
0603790F	0	9.783	13.433	11.341	11.567	12.253	12.033	12.228	Cont.
0603779N	0	9.528	13.330	11.267	11.179	11.825	12.426	12.718	Cont.

**D. Schedule Profile: N/A**

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM	
Research, Development, Test and Evaluation, Defense-wide BA 4	NATO Cooperative R&D PE 0603790D Project P790	
<p>A. <u>Project Cost Breakdown</u> (\$ in thousands)</p> <p>The nature of this program is such that the funds are allocated to the services/defense agencies for their management and expenditure. The only criteria imposed by OSD is that the funds be used for efforts defined by the international agreement. All projects are new and the funds are not released until the agreement is signed so we are unable to determine the contracts at this time. Reporting relates to technical progress and not the type of expenditure.</p> <p>Project Cost Categories</p> <p>Support of international Agreement</p> <p>FY 1996 FY 1997 FY 1998 FY 1999</p> <p>21.840 9.744 13.584 11.262</p> <p>B. <u>Budget Acquisition History and Planning Information</u> - NOT APPLICABLE</p>		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										Date: (MONTH/YEAR) February 1997	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE						
RDT&E, Defense-wide/ Budget Activity 4					Environmental Security Technology Certification Program (ESTCP) PE 0603851D						
Cost (in Millions)	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY2002	FY2003	Cost to Complete	Total Cost	
Total PE 0603851D Cost	25.257	21.587	15.164	17.422	18.087	17.897	18.192	18.532	Continuing	Continuing	
ESTCP/P514 Cost	25.257	21.587	15.164	17.422	18.087	17.897	18.192	18.532	Continuing	Continuing	

**A. Mission Description and Budget Item Justification**

This program demonstrates and validates the most promising innovative environmental technologies that target DoD's most urgent environmental needs and are projected to pay back the investment within five years through cost savings and improved efficiencies. It responds to: (1) congressional concern over the slow pace of remediation of environmentally polluted sites on military installations, (2) congressional direction to conduct demonstrations specifically focused on emerging new technologies, (3) Executive Order 12856 which requires Federal agencies to place a high priority on obtaining funding and resources needed for the development of innovative pollution prevention programs and technologies for installations and in acquisitions, and (4) the need to improve defense readiness by reducing the drain on the Department's operation and maintenance dollars caused by real world commitments such as environmental restoration and waste management. Preference for demonstrations are given to technologies that respond to Environmental Security objectives, have successfully completed all necessary research and development objectives, and address the highest priority DoD environmental requirements. Project funding supports the following categories for each year.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		Date: (MONTH/YEAR) February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	
<b>RDT&amp;E, Defense-wide/ Budget Activity 4</b>	<b>Environmental Security Technology Certification Program (ESTCP) PE 0603851D</b>	

**FY 1996 Accomplishments:**

- Reviewed and selected technologies for demonstration.
- Reviewed and selected sites for demonstration of remediation technologies.
- Prepared site-specific implementation plans (\$1.152 million).
- Prepared sites and secure regulatory permitting (\$5.760 million).
- Demonstration and evaluation of selected technologies (\$18.345 million).

**FY 1997 Plans:**

- Review and select technologies for demonstration.
- Review and select sites for demonstration of technologies.
- Prepare site-specific implementation plans (\$0.628 million).
- Prepare sites and secure regulatory permitting (\$3.142 million).
- Award demonstration testing and evaluation for selected technologies (\$17.817 million).

The FY97 funds are invested in projects which address priority DoD environmental requirements. The funds are programmed in the areas of:

- Cleanup: To demonstrate and validate innovative technologies to restore DoD facilities contaminated with toxic, explosive, or hazardous waste. (\$6.274 Million)
- Compliance: To demonstrate and validate innovative technologies to ensure DoD complies with our federal, state, and local environmental laws. (\$3.188 Million)
- Pollution Prevention: To demonstrate validate innovative technologies to reduce the use of hazardous materials, and curb emissions of pollutants in military operations as well as weapons systems manufacturing, operations, and maintenance. (\$12.125 Million)

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		Date: (MONTH/YEAR) February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE
<b>RDT&amp;E, Defense-wide/ Budget Activity 4</b>		<b>Environmental Security Technology Certification Program (ESTCP) PE 0603851D</b>

**FY 1998 Plans:**

- Review and select technologies for demonstration.
- Review and select sites for demonstration of technologies.
- Prepare site-specific implementation plans (\$0.639 million).
- Prepare sites and secure regulatory permitting (\$3.199 million).
- Award demonstration testing and evaluation for selected technologies (\$11.326 million).

**FY 1999 Plans:**

- Review and select technologies for demonstration.
- Review and select sites for demonstration of technologies.
- Prepare site-specific implementation plans (\$0.629 million).
- Prepare sites and secure regulatory permitting (\$3.176 million).
- Award demonstration testing and evaluation for selected technologies (\$13.617 million).

**FY 2000-03 Plans:** The ESTCP will continue to program and budget for the most promising innovative environmental technologies that target DoD's most urgent environmental needs and are projected to pay back the investment within five years.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		Date: (MONTH/YEAR) February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	
RDT&E, Defense-wide/ Budget Activity 4	Environmental Security Technology Certification Program (ESTCP) PE 0603851D	

Justification for Budget Activity Assignment: To conform to the defined DoD acquisition milestones sequence, this program element is categorized under Budget Activity 4, Demonstration and Validation (Dem/Val).

Acquisition Strategy: When demonstration and validation of a particular technology is completed, and if the technology is found to be effective and affordable by users, regulators and other stakeholders, a user data package will be developed and distributed, e.g., specification, procurement package, etc., providing details to users on the technologies validated cost and performance and on how to acquire and implement the technology. When this step is completed, the demonstration will be considered successful.

**B. Program Change Summary**

	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY1999</u>	<u>Total Cost</u>
Previous President's Budget	14,939	14,155	14,414	14,304	Continuing
Appropriated Value	26,939	22,155			
Adjustments to Appropriated Value					
a. Undistributed reduction	(1,682)	(,568)			
b. Current Budget Submit/President's Budget	25,257	21,587	15,164	17,422	Continuing

**Change Summary Explanation:** FY 1996 and FY 1997 changes are due to congressional undistributed reductions. FY 1998 and FY 1999 changes are due to DoD budget adjustments. FY 1998-2003 costs reflect changes due to increased requirements.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		Date: (MONTH/YEAR)  February 1997
APPROPRIATION/BUDGET ACTIVITY  <b>RDT&amp;E, Defense-wide/ Budget Activity 4</b>	R-1 ITEM NOMENCLATURE  <b>Environmental Security Technology Certification Program (ESTCP) PE 0603851D</b>	

#### D. Schedule Profile (Fiscal Year actual and planned events by quarter)

	FY 1996	FY 1997	FY 1998	FY 1999
	1    2    3	1    2    3	1    2    3	1    2    3
	4	4	4	4
Acquisition Milestones - Select technology		X		
- Select site				
Engineering Milestones - Complete site prep and regulatory permitting		X		
T&E Milestones - Complete T&E			X	
Contract Milestones				
Other Program Events - Obtain user, regulator and other stakeholder approvals				X
- Develop and distribute user data packages				X

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE (MONTH/YEAR)
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE PE NUMBER/PROJECT NUMBER	February 1997
RDT&E, Defense-wide/Budget Activity 4	Environmental Security Technology Certification Program (ESTCP) PE 0603851D	

A. Project Cost Categories ( \$ in thousands )

Project Cost Categories

Cost Categories:

- a. Demonstration & Validation
- b. Program Management Support

TOTAL

	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000
	22,497	20,335	14,014	16,202	16,827
	2,760	1,252	1,150	1,220	1,260
	25,257	21,587	15,164	17,422	18,087

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE (MONTH/YEAR) February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE PE NUMBER/PROJECT NUMBER	
RDT&E, Defense-wide/Budget Activity 4	Environmental Security Technology Certification Program (ESTCP) PE 0603851D	

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1997	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget FY2000	Budget to Complete Continuing	Total Program Continuing
DoD	C	-	-	-	68,368	21,587	15,164	17,422	18,067	-	-
Actual or Budget Value (\$ in millions)											

Government Furnished Property

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Product Development Property (list each item separately)									
Support and Management Property (list each item separately)									
Test and Evaluation Property (list each item separately)									
Subtotal Product and Development									
Subtotal Support and Management									
Subtotal Test and Evaluation									

N/A  
N/A  
N/A  
N/A  
N/A  
N/A

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>										Date: <b>February 1997</b>	
R-1 ITEM NOMENCLATURE											
Tactical Anti-Satellite Program Development - PE <b>0603892D</b>											
APPROPRIATION/BUDGET ACTIVITY											
<b>RDT&amp;E, Defense-wide/ Budget Activity 4</b>											
Cost (In Millions)	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	Cost to Complete	Total Cost	
Total PE 0603892D Cost	28.534	48.975	0	0	0	0	0	0	Continuing	Continuing	
Kinetic Energy anti-satellite Cost	28.534	48.975	0	0	0	0	0	0	Continuing	Continuing	

**A. Mission Description and Budget Item Justification**

**(U) BRIEF DESCRIPTION OF ELEMENT:** The U.S. military has become dependent on satellites as a primary source of information in virtually all of its operations and then looking at the world-wide proliferation of technology which is making this type capability readily available to virtually any country. Today, national defense planners and strategists have to operate with the knowledge that future adversaries will have access to satellite derived intelligence, warning, communications, navigation, weather and other information that can significantly enhance their war-fighting capability and increase the risk to U.S. and allied forces

(U) In 1989 the Department of Defense initiated a program to develop a ground-launched, kinetic energy (i.e., hit-to-kill) anti-satellite (KE ASAT) weapon system which would leverage off technologies developed by the U.S. Army Space and Strategic Defense Command in support of the (then) Strategic Defense Initiative Organization. Following a Milestone I Defense Acquisition Board Review in December of 1989, the Army was given responsibility for development of the weapon elements of the system (booster, kill vehicle, launch and ground support systems, and the mission and battery control centers.) The Air Force was given responsibility for development of the command and control elements that would have allowed the Commander-in-Chief, U.S. Space Command (USCINCSpace) to plan and control ASAT engagements.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		Date: <b>February 1997</b>
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	
<b>RDT&amp;E, Defense-wide/ Budget Activity 4</b>	Tactical Anti-Satellite Program Development - PE <b>0603892D</b>	

(U) With the end of the cold war the perceived need for this capability, as well as support for continued funding diminished steadily and the program was restructured several times. The National Defense Authorization Act for fiscal year 1994 (FY 1994) directed that the program be converted to a Tactical ASAT Technology Program as opposed to an acquisition program with a low funding level. Under this current program, the KE ASAT was test fired in September 1994, successfully meeting all requirements. This 94-pound kill vehicle is the critical component of a KE ASAT. The following was accomplished in FY 1995:

- \*KE ASAT KV Integration and Development
- Weapon Control System (WCS) prototype development completed
- ACTD planning and proposal completed and submitted

(U) Acquisition Strategy: The prime contract was awarded on a competitive basis in 1990 to Rockwell International. FY 1996 and FY 1997 funds were obligated on the existing contract. A technical analysis contract was awarded on a competitive basis as Small Business Innovative Research to DESE Research. Other major activities will be performed in-house and by OGA. Streamlined acquisition strategy has been adopted based on DoD 5000.2. Also, an integrated product team approach has been implemented. Commercial specifications have been adopted, and MIL-SPECS are used on an exception basis only for acquisition.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		Date: February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE
<b>RDT&amp;E, Defense-wide/ Budget Activity 4</b>		Tactical Anti-Satellite Program Development - PE 0603892D

(U) **FY 1996 Accomplishments:**

- Interceptor (missile and kill vehicle) (\$6,300K)
- Weapon Control Subsystem (\$4,600K)
- System Integration and Testing (\$6,800K)
- Software Integration (\$4,700K)
- Program Management (\$2,900K)
- Other government agencies (DOE Sandia, ARSPACE) (\$1,200K)
- Technical Simulation and Support (SBIR) (\$2,000K)

**Small Business Plan**

Out of the FY 1996 contracted-out funds, 13%.

(U) **FY 1997 Plans:**

- Interceptor (missile and kill vehicle) (\$10,875K)
- Weapon Control Subsystem (\$7,900K)
- System Integration and Testing (\$11,700K)
- Software Integration (\$8,100K)
- Program Management (\$5,000K)
- Other government agencies (DOE Sandia, ARSPACE) (\$2,000K)
- Technical Simulation and Support (SBIR) (\$3,400K)

(U) **FY 1998 Plans:** N/A

(U) **FY 1999 Plans:** N/A

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		Date: <b>February 1997</b>
R-1 ITEM NOMENCLATURE		
APPROPRIATION/BUDGET ACTIVITY	Tactical Anti-Satellite Program Development - PE 0603892D	
<b>RDT&amp;E, Defense-wide/ Budget Activity 4</b>		

**(U) B. Program Change Summary**

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>Total Cost</u>
Previous President's Budget	0	0	0	245.000 (Prior Years)
Appropriated Value	30.000	50.000	0	80.000
Adjustments to Appropriated Value	-1.466*	-1.025**	0	-2.491
Current Budget Submit/President's Budget	28.534	48.975	0	322.500

\* FY 1996 Adjustments:

Section 8046 FFRDC -\$206K

Section 8101 ADP -\$87K

Section 8125 Inflation -\$182K

Section 8129 Mgt. -\$401K

SBIR -\$ 582

Other Inflation -\$63K

Reprogram \$55K.

\*\* FY 1997 Adjustments:

Section 8136 General Reduction -\$1,025K.

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		Date: February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE
<b>RDT&amp;E, Defense-wide/ Budget Activity 4</b>		Tactical Anti-Satellite Program Development - PE 0603892D

(U) C. Other Program Funding Summary:

The original PE0603392A was established in 1989. By Congressional action, this PE was transferred to OSD under PE0603392D. Then, in 1996, the PE was changed to PE0603892D for more appropriate execution (Budget Activity 4). This is a continuation of the same Anti-Satellite program. (\$245 million up to FY 1995).

(U) D. Schedule Profile

Fiscal year actual and planned events by quarter

Project Milestones	1	FY 1995 2 3	4	1	FY 1996 2 3	4	1	FY 1997 2 3	4
• Guidance Navigation & Control PDR							X	X	
• Seeker CDR								X	
• Hardware-in-Loop Simulation								X	
• Test Readiness Review (Hover)								X	
• Hover Test									X
• Launcher interface design review									
• Command & Control integration								X	

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE PE NUMBER/PROJECT NUMBER	
RDT&E, Defense-wide/Budget Activity 4	Tactical Anti-Satellite Program Development PE 0603892D	

A. Project Cost Breakdown ( \$ in thousands )

Project Cost Categories

Cost Categories:

- a. Demonstration & Validation
- b. Program Management Support

TOTAL

	FY 1996	FY 1997	FY 1998	FY 1999
a. Demonstration & Validation	23,900	43,163	0	0
b. Program Management Support	4,634	6,812	0	0
TOTAL	28,534	48,975	0	0

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1995	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
DoD (USASDC)	C	Sep 90	-	-	246.0	28.5	49.0	0	0	322.5	322.5

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RDT&E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)										DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY:		R-1 ITEM NOMENCLATURE:								
RDT&E, Defense Wide / BA 4		Humanitarian Demining PE 0603920D								
COST (In Millions \$)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element Cost	0	0	10.000	0*	9.944	9.935	9.928	9.944	Continuing	Continuing

(U) A. Mission Descriptions and Budget Item Justification(U) BRIEF DESCRIPTION OF ELEMENTS:

(U) This program element develops, tests, and evaluates equipment for humanitarian demining. The program is focused on reducing the time and cost associated with demining while improving operational safety. The systems developed under this program are intended to meet the following technical objectives: locate minefields (or confirm their absence); detect individual mines; clear and destroy large numbers of mines rapidly and safely; enhance the safety of deminers; and provide tools to facilitate mine awareness and deminer training. The program applies current technology and systems developed from multiple sources including PE 0603120D and commercial efforts to rapidly develop and field demining equipment. The program seeks opportunities to leverage past and current R&D project activity in related areas, including tactical countermine and unexploded ordnance clearance. If significant improvements to equipment applicable to one technical objective are not likely to be achieved in the short term, the development effort is shifted to a more promising area.

\* No funds have been identified for FY 1999. The FY 1999 plans can be executed if funding is provided.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1996 Accomplishments:

(U) Not Applicable

(U) FY 1997 Plans:

(U) Not Applicable

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<b>RDT&amp;E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY:	R-1 ITEM NOMENCLATURE:	
RDT&E, Defense Wide / BA 4	Humanitarian Demining PE 0603920D	

(U) FY 1998 Plans:

(U) Continue rapid prototyping of mine clearance and neutralization equipment that can be fielded in the short term, leveraging past and current R&D project activity in related areas. This equipment will be provided to trainers for further CONUS and OCONUS filed evaluation. Continue developing and managing a database of technical and operational demining information that can be provided to DoD agencies, non-governmental organizations, private volunteer organizations, and contractors specializing in humanitarian demining. (\$10.0 million)

(U) FY 1999 Plans:

(U) Continue rapid prototyping of mine clearance and neutralization equipment that can be fielded in the short term, leveraging past and current R&D project activity in related areas. This equipment will be provided to trainers for further CONUS and OCONUS filed evaluation. Continue developing and managing a database of technical and operational demining information that can be provided to DoD agencies, non-governmental organizations, private volunteer organizations, and contractors specializing in humanitarian demining. (\$10.0 million)

(U) ACQUISITION STRATEGY: Not Applicable(U) B. Program Change Summary

	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>To Complete</u>	<u>Total Cost</u>
FY-1997 President's Budget:	0	0	0	0	Continuing	Continuing
Appropriated Value:	0	0				
<u>Adjustments to Appropriated Value:</u>						
a. Congressionally-directed undistributed reduction:						
b. Rescission/Below-threshold reprogramming:			10,000	0	Continuing	Continuing
c. Other:						
FY-1998/99 President's Budget:	0	0	10,000	0	Continuing	Continuing

Change Summary Explanation:

Funding:	Not Applicable
Schedule:	(total PE or Project, as applicable) Not Applicable
Technical:	(total PE or Project, as applicable) Not Applicable

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<b>RDT&amp;E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE: February 1997
APPROPRIATION/BUDGET ACTIVITY:  RDT&E, Defense Wide / BA 4	R-1 ITEM NOMENCLATURE:  Humanitarian Demining PE 0603920D	

(U) C. Other Program Funding Summary Cost:

None

(U) D. Schedule Profile: Not Applicable

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE February 1997

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

## 5 - Engineering and Manufacturing Development

## 0604160D Counterproliferation Engineering and Manufacturing Development

P536

COST (In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
P536 Specific Emitter Identification (SEI)	2647	2583	0	0	0	0	0	0	0	5298

**A. Mission Description and Budget Item Justification**

In August 1994, DoD established the Counterproliferation Support Program specifically to address the DoD shortfalls in counterproliferation operational capabilities documented in the May 1994 Report to Congress titled *Report on Nonproliferation and Counterproliferation Activities and Programs*. Counterproliferation Support Program funds are used to leverage DoD acquisition programs to meet the counterproliferation priorities of the Commanders-in-Chief (CINCs) of the Combatant Commands and accelerate the deployment of enhanced capabilities to the field. Specifically, the goal of the Counterproliferation Support Program is to improve specific military counterproliferation capabilities by (1) building on ongoing programs in the Services, DoD agencies, Department of Energy and U.S. Intelligence; (2) focusing on the most critical counterproliferation shortfalls to address major gaps in deployed capabilities (as reflected in the CINCs' priorities and the Counterproliferation Review Committee's (CPRC) prioritized list of counterproliferation Areas for Capability Enhancements); (3) leveraging existing program funding to more rapidly field capabilities by accelerating the deliverables of DoD programs; (4) identifying and enhancing the development of high payoff technologies to accelerate capabilities to the warfighter; (5) identifying and promoting key non-materiel initiatives that complement technological advances; and (6) transitioning Counterproliferation Support Program projects to the Services as soon as practicable.

**Project P536 - Specific Emitter Identification (SEI):** The objective of this project is to enhance the acquisition and evaluation of the Navy's SEI system hardware. This technology will improve the Navy's capability to identify, monitor and track specific vessels that are suspected of transporting Weapons of Mass Destruction materials. A total of 28 prototype SEI systems will be purchased under this project for installation and evaluation on board Navy aircraft and ships.

**Acquisition Strategy:****FY 1996 Accomplishments:**

- 685 Delivered 1 Choke Point Shore-Based System
- 362 Delivered 3 EP-3E/VPU P-3 Aircraft-Based Systems
- 635 Delivered 3 P-3C Aircraft-Based Systems
- 130 Delivered 1 ES-3 Aircraft-Based System
- 731 Delivered 2 Ship-Based Systems
- 104 Prototype Evaluations

Total 2647

Project P536

Page 1 of 3 Pages

Exhibit R-2 (PE 0604160D)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1997
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
<b>5 - Engineering and Manufacturing Development</b>	<b>0604160D Counterproliferation Engineering and Manufacturing Development</b>	<b>P536</b>	
<b>FY 1997 Planned Program:</b>			
• 1245 Deliver 3 Ship-Based Systems			
• 550 Deliver 2 LAMPS MKIII Helicopter-Based Systems			
• 400 Deliver 2 Development Systems			
• 336 Deliver 1 Training System			
• 52 Small Business Innovation Research Program			
Total	2583		
<b>FY 1998 Planned Program:</b>			
• 0 Program to be completed in FY 1997.			
<b>FY 1999 Planned Program:</b>			
• 0 Program to be completed in FY 1997.			
<b>B. Project Change Summary</b>			
FY 1997 President's Budget	FY 1996	FY 1997	FY 1998
Appropriated Value	2676	2787	0
Undistributed Congressional Adjustments	2786	2583	N/A
FY 1998 President's Budget	-139	0	N/A
	2647	2583	0
			Total Cost
			5463
			N/A
			N/A
			5230
<b>C. Other Program Funding Summary</b>			
Not Applicable.			
<b>D. Schedule Profile</b>			
	FY 1996	FY 1997	FY 1997
1	2	3	4
	X	X	X
• Procure Receivers			
• Test Antenna Pods		X	X
• Deliver Choke Point Shore-Based Systems		X	X
• Deliver Aircraft/Helicopter-Based Systems		X	X
• Deliver Ship-Based Systems	X	X	X
• Install and Evaluate		X	X
Project P536			
Page 2 of 3 Pages			
Exhibit R-2 (PE 0604160D)			

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## RDT&amp;E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE February 1997

PROJECT

P536

BUDGET ACTIVITY

PE NUMBER AND TITLE

0604160D Counterproliferation Engineering and  
Manufacturing Development

## 5 - Engineering and Manufacturing Development

A. Project Cost Breakdown

FY 1996

FY 1997

SEI Processor Procurement	1375	1300
MMIC Receiver Procurement	285	285
Ship/Land-Based Antenna Procurement	245	271
Aircraft Pod Mounted Antenna	240	320
Radar Scan Converter Procurement	55	55
Wideband Activity Monitor	171	0
System Integration	276	300
Total	2647	2531

B. Budget Acquisition History and Planning Information

## Performing Organizations

Contractor or Government Performing Activity	Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	FY 1996	FY 1997	Budget to Complete	Total Program
Naval Research Laboratory	WX				255	771	530	0	1606
Hughes Aircraft Company	C/FFP	Dec 1994			1085	1375	1300	0	3760
Kaman Sciences	C/CPFF	Dec 1994			580	501	701	0	1784
Total Project					1920	2647	2531	0	7150

Project P536

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Exhibit R-3 (PE 0604160D)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5										R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System (JTIDS) - 0604771D
COST (In Millions)	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	57.886	43.360	55.429	31.633	17.755	18.252	18.642	19.080	Cont.	Cont.
Joint Tactical Information Distribution System (JTIDS) - P771	14.998	5.442	3.191	2.896	4.620	4.546	4.661	4.770	Cont.	Cont.
Multifunctional Information Distribution System-Low Volume Terminal (MIDS-LVT) - P773	42.888	37.918	52.238	28.737	13.135	13.706	13.981	14.310	Cont.	Cont.

A. Mission Description and Budget Item Justification

JTIDS is a joint program to acquire a highly jam-resistant, secure, high capacity, digital voice and data distribution system providing integrated communications, navigation, and identification for use in a joint tactical combat environment among tactical command and control elements and selected weapons systems. MIDS-LVT, a P3I to the JTIDS Class 2 terminal, is an international (U.S., France, Italy, Germany, and Spain) cooperative development program to acquire a low-volume (size and weight) terminal with the same functionality of JTIDS. MIDS-LVT will be interoperable with the U.S. JTIDS program, STANAGS 4175 and 5516 apply. This Program Element funds development, prototype fabrication, and test of common JTIDS and MIDS-LVT terminal equipment consistent with integration schedules for the service's and nation's host platforms.

This program is funded under BA-5, Engineering and Manufacturing Development, because it encompasses engineering and manufacturing development of new end-items prior to production approval decision.

B. Program Change Summary - See individual project R-2 pages

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5										R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System - 0604771D	
COST (In Millions)	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	Cost to Complete	Total Cost	
JTIDS - P771	14.998	5.442	3.191	2.896	4.620	4.546	4.661	4.770	Cont.	Cont.	
A. Mission Description and Budget Item Justification											

JTIDS is a multi-service program to acquire a highly jam-resistant, secure, high capacity, digital voice and data distribution system providing integrated communications, navigation, and identification for use in a tactical combat environment among tactical command and control elements and selected weapons system. This program element funds development, prototype fabrication, and test of common terminal equipments for all service applications, in conjunction with integration schedules for the host platforms.

PROGRAM ACCOMPLISHMENTS AND PLANS

1. FY 1996 ACCOMPLISHMENTS:

- PROGRAMS (\$3.324 Million):
  - Class 2M Milestone III Full Rate Production Approval Support
    - Completing/overseeing all DAB documentation
    - JTIDS STAR Update
  - CDT&E: Support the maintainability demo and production verification testing (PVT)
    - Contract Acquisition Support
    - Procurement support to Navy and Marines
    - Ship repaired items back to users
    - Support of 0035 Follow-On, PIP, FY94 and LRIP contracts
  - DTOE/IOE: Coordinate, manage and monitor development and operational testing
    - Physical Configuration Audit (PCA) of selected SRUs
    - Technical Support
    - Support deployment of Programmable Electronics Load Verifier (PELV)
    - Support training and testing/DEMOS
    - Review and update tech manuals

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System - 0604771D	

1. FY 1996 ACCOMPLISHMENTS (continued):

- INTEGRATION (\$0.408 Million)
  - Integration Support for Army Platforms
  - Marine Shelters (Mod/Integ)
- INTEROPERABILITY (\$0.556 Million)
  - Technical support and Link-16 support for International/FMS
  - JTIDS Test Device: Maintenance of Link-16 test devices to support user integration and testing
- STANAG 4175: Presenting/defending U.S. position on document/standard development, maintenance, publication and documentation distribution
- SUSTAINMENT (\$9.319 Million)
  - Firmware Technical Design Documentation
  - Support Network Design Aid
  - Technical engineering software support
  - 2M and 2/2H Pre-Op support
  - Class 2/2H Tech manual updates
  - Support Depot-Level development program
  - Development of the SRU TPSS for the HPA and PIP R/S
  - NADEP TPS ISE Support (Updates, Engineering Investigations and Maintenance)
  - Verification of TPS Program Requirements at PDR, CDR and DVD testing
  - HPA, FPS, TEP H/W items and drawings for the SRU TPSS to interface the HPA under test, to the CASS Station
  - FSD terminal updates
  - CSSA Support
  - Operational sustainment
  - Retrofit MGT @ DEPOT
  - TEST (\$0.697 Million)
    - Field support for demos and exercises and contingencies
    - Support for 46th Test Squadron
  - SPECTRUM SUPPORT (\$0.694 Million)
    - Efforts, including testing, associated with receiving and maintaining frequency certification

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System - 0604771D	

## 2. FY 1997 PLANS:

- PROGRAMS (\$1.2 Million)
  - Class 2M Milestone III Full Rate Production Approval Support
    - Completing/overseeing all DAB documentation
    - JTIDS STAR Update
    - CDT&E: Support the maintainability demo and production verification testing (PVT)
- INTEROPERABILITY (\$0.4 Million)
  - Technical support and Link-16 support for International/FMS
  - STANAG 4175: Presenting/defending U.S. position on document/standard development, maintenance, publication and documentation distribution
- SUSTAINMENT (\$0.9 Million)
  - Technical engineering software support
  - 2M Pre-Op support
  - FSD terminal updates
  - CSSA support
  - Operational sustainment
  - Retrofit Mgt @ DEPOT
  - TEST (\$0.4 Million)
    - Field support for demos and exercises and contingencies
  - SPECTRUM SUPPORT (\$1.94 Million)
    - Efforts, including testing, associated with receiving and maintaining frequency certification
  - LINK-16 ENGINEERING (\$0.490 Million)
    - Develop/analyze increased operational requirements
    - Technical/engineering studies
  - SBIR Contribution (\$0.112 Million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System - 0604771D	

3. FY 1998 PLANS:

- INTEROPERABILITY (\$0.4 Million)
  - Technical support and Link-16 support for International/FMS
- STANAG 4175: Presenting/defending U.S. position on document/standard development, maintenance, publication and documentation distribution
- TEST (\$0.4 Million)
  - Field support for demos and exercises and contingencies
- SPECTRUM SUPPORT (\$1.889 Million)
  - Efforts, including testing, associated with receiving and maintaining frequency certification
- LINK-16 ENGINEERING (\$0.502 Million)
  - Develop/analyze increased operational requirements
  - Technical/engineering studies

4. FY 1999 PLANS:

- INTEROPERABILITY (\$0.4 Million)
  - Technical support and Link-16 support for International/FMS
- STANAG 4175: Presenting/defending U.S. position on document/standard development, maintenance, publication and documentation distribution
- TEST (\$0.3 Million)
  - Field support for demos and exercises and contingencies
- SPECTRUM SUPPORT (\$1.896 Million)
  - Efforts, including testing, associated with receiving and maintaining frequency certification
- LINK-16 ENGINEERING (\$0.3 Million)
  - Develop/analyze increased operational requirements
  - Technical/engineering studies

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System - 0604771D	

B. Program Change Summary

Previous President's Budget (FY 1997)  
Appropriated Value  
Adjustments to Appropriated Value

a. Congressionally directed  
undistributed reduction

Current Budget Submit/OSD Budget

	FY1996	FY1997	FY1998	FY1999	Total Cost Cont.
	15.025	5.590	3.202	2.909	
	15.025				
	(.027)	(.148)	(.011)	(0.013)	
	14.998	5.442	3.191	2.896	Cont.

Change Summary Explanation:

Funding: Funding adjustments during budget review/execution.  
Schedule: N/A  
Technical: N/A

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5		R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System - 0604771D

C. Other Program Funding Summary

	FY1996 & PRIOR	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Comel	Total Cost
PE 27130F	91.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
PE 27417F	29.8	24.0	4.0	3.2	0.0	0.0	0.0	0.0	0.0	61.0
PE 27419F	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7
PE 27581F	15.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.8
PE 27412F	106.8	0.0	22.1	15.0	0.0	0.0	0.0	0.0	0.0	143.9
PE 35154F	9.4	3.4	4.8	4.8	0.0	0.0	0.0	0.0	0.0	22.4
Multi (BMDO)	31.6	19.3	20.2	0.0	0.0	0.0	0.0	0.0	0.0	71.1
PE 28014A	12.9	14.9	6.8	0.7	0.0	0.0	0.0	0.0	0.0	35.3
PE 42310M	10.3	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.9
204152N	139.1	4.3	5.5	0.0	0.0	0.0	0.0	0.0	0.0	148.9
204112N	53.9	6.7	4.6	0.0	0.0	0.0	0.0	0.0	0.0	65.2
204660N	148.5	13.1	20.8	2.2	2.7	0.0	0.0	0.0	0.0	187.3
TOTAL	656.5	90.3	88.8	25.9	2.7	0.0	0.0	0.0	0.0	864.2

Related RDT&E: 64754F, 25604N; 64702A; 63216C; 63861C; 64779F; 64770F; 27417F; 27419F; 27412f; 35154F; & 64719M

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System - 0604771D	

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	<u>FY1996</u>				<u>FY1997</u>				<u>FY1998</u>			
	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones												
Engineering Milestones												
T&E Milestones												
Contract Milestones												

Complete

MS OT III

LRIP (2M)

FRP (2M)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5					R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System - 0604771D						
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY 2002	FY 2003	Cost to Complete	Total Cost	
MIDS - P773	42.888	37.918	52.238	28.737	13.145	13.706	13.981	14.310	Cont.	Cont.	

A. Mission Description and Budget Item Justification  
MIDS Low-Volume Terminal (LVT) is an international (U.S., France, Germany, Italy, and Spain) cooperative development program to acquire a highly jam-resistant, secure, digital (voice and data) information distribution system providing integrated communications, navigation, and identification for use in a tactical combat environment. The system will provide sufficient connectivity and capacity to permit rapid exchange of command, control and status information among tactical command and control elements. MIDS LVT will be interoperable with the U.S. JTIDS program, STANAGs 4175 and 5516 apply. This Program Element will fund (in accordance with the U.S. Cost Share) development, EMD terminals, and test of common terminal equipment, consistent with integration schedules for the host platforms. This effort does not include the MIDS F-15 Fighter Data Link which is fully funded as a procurement F-15 modification program element.

PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1996 ACCOMPLISHMENTS:
  - Continued MIDS EMD (\$42.888 Million)
  - Initiated Supplement 3 negotiations
  - Conducted Terminal Critical Design Review (CDR) (N/A)
  - Conducted MIDS Interface Simulator (MIS) CDR
  - Initiated orders for engineering and spares for support of EMD terminals

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System - 0604771D	

## 2. FY 1997 PLANS:

- Continue MIDS EMD (\$37.918 Million)
- Complete Supplement 3 negotiations
- Deliver MIDS terminals
- Deliver MIDS Interface Simulator (MIS) Versions I and II (N/A)
- Initiate CDT&E testing
- Initiate production readiness activities
- SBIR Contribution

## 3. FY 1998 PLANS:

- Continue MIDS EMD (\$52.238 Million)
- Deliver MIDS terminals
- Deliver MIDS Interface Simulator (MIS) Version III (N/A)
- Conclude CDT&E testing
- Continue production readiness activities
- Initial Production Decision 4Q

## 4. FY 1999 PLANS:

- Continue MIDS EMD (\$28.737 Million)
- Award initial production contracts
- Support F/A-18 integration TECHEVAL 4Q
- Continue delivery of MIDS terminals
- Achieve IOC for MIDS on Ship
- Support Army MIDS testing
- Correct testing deficiencies
- Complete production readiness activities

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System - 0604771D	

## B. Program Change Summary

Previous President's Budget (FY 1997)  
Appropriated Value  
Adjustments to Appropriated Value

	FY1996	FY1997	FY1998	FY1999	Total Cost Cont.
a. Congressionally directed undistributed reduction	42.765 42.765	38.911	52.411	28.872	
b. Other	.123	(.993)	(.173)	(0.135)	
Current Budget Submit/OSD Budget	42.888	37.918	52.238	28.737	Cont.

## Change Summary Explanation:

Funding: N/A  
Schedule: N/A  
Technical: N/A

## C. Other Program Funding Summary

	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Compl	Total Cost
Procurement:										
APN	33.704	70.681	65.440	57.436	54.468	Cont.	Cont.	Cont.		
SCN	9.400	10.700	8.700	11.500	6.400	Cont.	Cont.	Cont.		
OPN (LK16)	36.304	27.587	26.718	31.526	36.273	Cont.	Cont.	Cont.		
Milcon: None										
Related RDT&E,N: 25.765 27.463 38.779 40.907 27.748 16.341 16.692 17.076									Cont.	Cont.
(PE 0205604N Project 2126, ATDLs Integration)										

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER	February 1997
RDT&E, Defense-Wide/BA-5	Joint Tactical Information Distribution System (JTIDS)/0604771D/P771	

A. Project Cost Breakdown (\$ in Thousands)

Project Cost Categories

	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>
a. Programs	3,324	1,200	0	0
b. Integration	408	0	0	0
c. Interoperability	556	400	400	400
d. Sustainment	9,319	900	0	0
e. Test	697	400	400	300
f. Spectrum Support	694	1,940	1,889	1,896
g. Link-16 Engineering	0	490	502	300
H. SBIR Contribution		112		
Total	14,998	5,442	3,191	2,896

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE
APPROPRIATION/BUDGET ACTIVITY			February 1997
RDT&E, Defense-Wide/BA-5			
R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER			
Joint Tactical Information Distribution			
System (JTIDS)/0604771D/P771			

### B. Budget Acquisition History and Planning Information

#### Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1995	Budget 1996	Budget 1997	Budget 1998	Budget 1999	Budget to Complete \$ Total Program
<b>Product Development Organizations</b>										
GEC-MARCONI	SS/PPP	12/85	476,000	476,000	474,389	514	200	0	0	CONT.
MISC CONTRACTS	N/A	VARIOUS	N/A	N/A	N/A	984	350	0	0	CONT.
<b>Support and Management Organizations</b>										
ECAC	FM616	10/93	N/A	N/A	N/A	473	240	489	194	CONT.
FAA	FM185	03/94	N/A	N/A	N/A	125	125	125	125	CONT.
NRAD	MITR	10/93	N/A	N/A	N/A	30	0	0	0	CONT.
WR-ALC	VARIOUS	VARIOUS	N/A	N/A	N/A	6,102	325	0	0	CONT.
ESC	VARIOUS	VARIOUS	N/A	N/A	N/A	1,250	604	300	300	CONT.
MITRE	PR	10/93	N/A	N/A	N/A	2,163	1,188	1,200	1,200	CONT.
CONTRACT SUPPORT	VARIOUS	VARIOUS	N/A	N/A	N/A	2,852	1,798	677	677	CONT.
SBIR CONTRIBUTION							112			
<b>Test and Evaluation Organizations</b>										
EGLIN	FM185	10/93	N/A	N/A	N/A	500	500	400	400	CONT.
MC DONNELL DOUGLAS	PR	VARIOUS	N/A	N/A	N/A	0	0	0	0	CONT.
MISC	VARIOUS	VARIOUS	N/A	N/A	N/A	5	0	0	0	CONT.

Government Furnished Property  
Product Development Property  
Support and Management Property

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER	
RDT&E, Defense-Wide/BA-5	Joint Tactical Information Distribution System (JTIDS)/0604771D/P771	

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>
Subtotal Product Development	1,498	550	0	0
Subtotal Support and Management	12,995	4,392	2,791	2,496
Subtotal Test and Evaluation	505	500	400	400
Total Project	14,998	5,442	3,191	2,896

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		Date February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER Joint Tactical Information Distribution System (JTIDS)/060477ID/P773	

A. Project Cost Breakdown (\$ in Thousands)

Project Cost Categories

	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>
a. EMD Contract	35,902	23,766	34,800	15,300
b. Engineering Support	6,986	14,152	17,438	13,437
Total	42,888	37,918	52,238	28,737

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE
APPROPRIATION/BUDGET ACTIVITY		February 1997
RDT&E, Defense-Wide/BA-5		
R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER		
Joint Tactical Information Distribution System		
(JTIDS)/0604771D/P773		

### B. Budget Acquisition History and Planning Information

#### Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1995	Budget 1996	Budget 1997	Budget 1998	Budget 1999	Total Program
NCCOSC SD WX		11/95								
		11/96				900	3,988	4,108	4,231	CONT. CONT. CONT.
		11/97								
MIDUSCO	S/CPIF	11/98								
		11/95				35,702	23,766	34,800	15,300	CONT. CONT. CONT.
		11/96								
All Other Product Development	WX	11/97								
		11/98				4,427	8,449	11,555	7,431	CONT.
Support and Management Organizations	All Other Support and Management					1,659	1,715	1,775	1,775	CONT.

#### Test and Evaluation Organizations

NOTE: T&E is funded by the Services.

Government Furnished Property  
Product Development Property  
Support and Management Property

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE
APPROPRIATION/BUDGET ACTIVITY		February 1997
RDT&E, Defense-Wide/BA-5		R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER
		Joint Tactical Information Distribution System (JTIDS)/0604771D/P773

	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>
Subtotal Product Development	41,229	36,203	50,463	26,962
Subtotal Support and Management	1,659	1,715	1,775	1,775
Subtotal Test and Evaluation	0	0	0	0
Total Project	42,888	37,918	52,238	28,737

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{PRIVATE} RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997													
{PRIVATE} APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. COUNTERDRUG INTELLIGENCE PROGRAMS PE 0305889D													
RDT&E/BA 7															
{PRIVATE} COST (In Millions)		FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost				
Total Program Element (PE) Cost		12.614	0	0	0	0	0	0	0	Continuing	Continuing				
Project Name/No. and Subtotal Cost Counterdrug Intel Programs/P480		12.614	0	0	0	0	0	0	0	Continuing	Continuing				

A. Mission Description and Budget Item Justification

**Brief Description and Budget Item Justification:** PE includes all resources provided in support of Counterdrug programs managed by the Intelligence Systems Support Office (ISSO) as directed by the ASD(C3I). Funding was budgeted in and provided from the Central Transfer Account and placed into this program element for execution of the following counterdrug projects:

- National Drug Intelligence Center (NDIC) for DoD
- Gulf States Counternarcotics Initiative (GSCI)
- Throttle Car (TC)

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[PRIVATE ]	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
[PRIVATE ] APPROPRIATION/BUDGET ACTIVITY. RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. COUNTERDRUG INTELLIGENCE PROGRAMS PE 0305889D		

Program Accomplishments and Plans:

- FY 1996 Accomplishments (RDT&E):  
Program and engineering support for the design and installation of the various tasks such as (4.614 Million):
  - Automated Information System (AIS) Facility Upgrade
  - Document Exploitation System Upgrade
- Begin replacement of the hardware supporting Juliet Site Operations (8.000 Million)
- FY 1997 RDT&E Plans:
- NDIC funding transferred to NFIP in FY97
- Complete replacement of the hardware supporting Juliet Site Operations for the TC Program

CD Intelligence Programs is in Budget Activity 7, Operational Systems Development because it is consistent with established DoD definitions for BA 7.  
Provide an acquisition strategy. Not Applicable.

{PRIVATE }B. <u>Program Change Summary</u>	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	Total Cost
Previous President's Budget	4.814				Continuing
Appropriated Value	12.814				
Adjustments to Appropriated Value	-200				
a. Congressionally-directed undistributed					

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[PRIVATE ]	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
[PRIVATE ] APPROPRIATION/BUDGET ACTIVITY, RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. COUNTERDRUG INTELLIGENCE PROGRAMS PE 0305889D	

reduction.

b. Reprogramming Action

c. DoD Budget Adjustment

Current Budget Submit/President's Budget 12.614

Change Summary Explanation: NA

Funding: NA.

Schedule: NA

Technical: NA

Continuing

C. Other Program Funding Summary Cost

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	<u>Compl</u>	<u>Cost</u>	<u>To</u>	<u>Total</u>
O&M, Defense-wide (PE 0305889D)												
GSCI												
TC												
NDIC												
Procurement, Defense-wide (PE 0305889D)												
NDIC												

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[PRIVATE ]	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
[PRIVATE ] APPROPRIATION/BUDGET ACTIVITY. RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. COUNTERDRUG INTELLIGENCE PROGRAMS PE 0305889D	

**D. Schedule Profile**

**GSCI:**

- Initiate Mississippi CN Center Upgrade 4QFY96
- Begin operational testing of inter-state system 4QFY96
- Establish state drug intelligence libraries for Open Source access 1QFY97
- Continue Operation Pipeline focus on highway interdiction efforts 1QFY97
- Develop connectivity architecture for expansion for additional states 2QFY97
- Establish connectivity between Georgia and Gulf States 3QFY97
- Continue analysis and integration of data base material for the four states 4QFY97

**NDIC:**

- Provide Program Management and Engineering support for design and installation of the following tasks:
  - Completion of Automated Information System (AIS) Facility Upgrade 4QFY96
  - Complete Document Exploitation Branch system upgrade 1QFY97
  - Begin preparation for Firewall technology insertion 1QFY97
  - Completion of Phase 2 of Drug Group Model application (IOC) 2QFY97
  - Completion of Analytical Research Center (ARC) 3QFY97
  - Completion of Phase 3 of Drug Group Model application 4QFY97



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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)												DATE 1997	February	
APPROPRIATION / BUDGET ACTIVITY						R-1 ITEM NOMENCLATURE								
Research, Development, Test & Evaluation, Defense-wide B/A 6						Technical Studies, Support & Analysis								PE 0605104D
COST (in Millions)						FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	
Total Program Element (PE) Cost						30.251	30.447	36.376	40.355	41.548	42.599	43.372	44.254	
P421 Tech Studies, Support & Analysis						30.251	30.447	36.376	40.355	41.548	42.599	43.372	44.254	

**A. Mission Description and Budget Item Justification**

**BRIEF DESCRIPTION OF ELEMENT:** This program element is classified in Budget Activity 6 because it is the primary source of funding for the office of the Secretary of Defense and the Joint Staff for studies, analyses, management, and technical support efforts to improve and support policy development, decision-making, management and administration of DoD programs and activities. Specific projects address a variety of complex issues and dynamic problems facing the Under Secretary of Defense for Acquisition and Technology [USD(A&T)], Under Secretary of Policy [USD(P)], Under Secretary of Defense for Personnel and Readiness [USD(P&R)], Assistant Secretary of Defense for Command, Control, Communications and Intelligence [ASD(C3I)], Director for Program Analysis and Evaluation (DPA&E), the Joint Staff and Unified Command Commanders. Studies and analyses examine the implications and consequences of current and alternative policies, plans, operations, strategies and budgets, and are essential for understanding and gaining insight into the complex multifaceted international, political, technological, economic, military, and acquisition environments in which defense decisions and opportunities take place. With a declining defense budget and force structure, and more diverse and uncertain threats facing the Nation in the current global economic environment and post-cold war era, the need for objective large system analyses, forward-looking policy, and resource planning for the immediate through the long-range becomes ever more acute.

**PROGRAM ACCOMPLISHMENTS AND PLANS:**

**FY 1996 Accomplishments:**

- Assessment of deep attack capabilities, both fielded and under development by all Services, from the CINC's perspective, to determine the appropriate combination and quantities of weapons for maximum effectiveness
- Analysis of the application of statistical process control to Weapon System program management, with the goal of lowering contract costs, breaking the pattern of high cost estimates becoming self-fulfilling
- Analyses of space systems architectures and integration
- Improving and monitoring the DoD process for developing, maintaining, and using specifications and standards
- Analyses in support of International Arms Control
- Continued development of electronic deskbook reference for all DoD acquisition managers
- Continued development of integrated strategy to produce affordable weapons systems applying new manufacturing and business process
- Metrics and benchmarking for acquisition reform initiatives.
- Analysis of Ballistic Missile Defense and Cruise Missile Defense core program issues.
- Developed a systems and acquisition plan for a potential small synthetic aperture radar (SAR) satellite constellation.

**General Support for USD(A&T):**

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	
Research, Development, Test & Evaluation, Defense-wide B/A 6		Technical Studies, Support & Analysis PE 0605104D

- Analyzed and evaluated various constellation sizes, types of collection modes, and systems costs for both satellites as well as launch costs.
- Assisted in the development of long-range MILSATCOM goals supporting the architecture. This architecture was approved by the Joint Space Management Board (JSMB).
- Assisted in aligning the Future Year's Defense Program (FYDP) for the MILSATCOM Architecture consistent with the long-term architecture.
- Developed plans for the transition to implement the long-range MILSATCOM architecture program plans.

FY 1997 Initiatives:

- Support to the Congressionally-mandated Quadrennial Defense Review
- Spin-off research required after the cost and operational effectiveness assessments of deep attack weapons mix
- Continued implementation, tracking, and metrics of acquisition reform initiatives--specifications & standards reform, workforce incentives and training
- Analysis and planning for alternatives to land mines, enhanced demining capabilities, and clearance of anti-personnel land mines and unexploded ordnance
- Analyses of Theater and National Missile Defense requirements
- Evaluation of functional areas which may become candidates for privatization/contracted services
- Whole-DoD Analysis of many critical and diverse issues -- Aircraft recapitalization alternatives, weapons systems operational and support (O&S) costs, program management risk and cost by applying statistical process control models, cruise missile defense systems, NATO and Former Soviet Union environmental issues, domestic dual use and international commercial technologies, international arms cooperation
- To provide direct support to a broad-based, National Space Protection Study through research, analysis, and drafting associated long-range plans.
- Review and propose revisions to existing DoD policy and long range planning documents, regarding space control and space systems protection. Research and develop relevant background information to support a Departmental position on protection of space-based systems.
- Evaluate the Space Launch Infrastructure for options available, to provide assured access to space. This includes the procurement of launch services or "capability on orbit". The impact of new launch systems such as the EELV need to be quantified and trade studies performed. Additionally, with the projected increase of commercial launch activity, the impacts to government launches and recovery of indirect costs that support the commercial launch industry need to be addressed to determine what, if any legislative or regulations might need adjusting.
- Develop satellite operations architecture alternatives for 2010-2015. This architecture will guide technology investment, future operations planning, acquisition planning, and program execution in support of DOD, Civil, and National satellite operations needs. The objective is to provide a range of architectural alternatives from which to choose the framework that best meets the cost, performance, and policy objectives of the government space community.

FY 1998 Plans:

- Assess the current state of the space surveillance network including systems, operations, maintenance/readiness, and planned upgrades. This information will be used to address the future architectural plans associated with space surveillance. Space Surveillance technology planning is also included.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY Research, Development, Test & Evaluation, Defense-wide B/A 6	R-1 ITEM NOMENCLATURE Technical Studies, Support & Analysis PE 0605104D	

- Implement the National Security Space Master Plan by assessing the Space Related Mission Areas of Satellite Communications (including MILSATCOM, EHF, SHF, UHF, Commercial), Command, Control, & Tracking, Early Warning, Navigation Environmental, Reconnaissance and Launch.
- Assess the technology of cross program integration and interoperability with commercial space system proposals and functional architectures of the various Space Related Mission Areas.
- Explore ways to maximize competition in the vertically-integrated Defense environment
- Continue development of electronic desktop help and reference materials for acquisition managers
- Policy development and analysis, and resource adjustment evaluations spawned after the Quadrennial Defense Review
- Continue validation of qualifications standards, Professional career development, and personnel data management for the Acquisition Workforce.
- Continue planning Defense manufacturing affordability initiatives with Defense industries
- Create bilateral discussions between senior managers in US and Japan on joint defense systems development and technology cooperation.
- Assess the operation and effectiveness of the Export Loan Guarantee Program, and develop requisite policy changes and constraints.
- Continue evaluations of resource allocation policies and modernization strategies, to increase stability of Major Defense Acquisition Programs.
- Assess acquisition policy and regulatory decision-making processes to ensure involvement of the defense industries and the public at large in these decision processes, institutionalizing the continuous process improvement begun by the integrated product teams which jump-started Departmental acquisition reform.
- Continue to evaluate options for developing a National Missile Defense system consistent with the emerging missile threat.
- Continue to reduce inventory investment through improved inventory management, driven by assessments and analyses of several initiatives.
- Pursue initiatives to help defense segments the small business community become an integral part of the globally competitive national industrial base.
- Analyses in support of Vision 21—a plan to reduce, restructure, and revitalize Defense Laboratories and Test & Evaluation Centers.

FY 1999 Plans: This program is the primary funding source for acquiring high quality, objective studies, analyses, and policy research supporting senior DoD management and decision makers in the Office of the Secretary of Defense. It produces the analytical bases for mission area rethinking, policy analysis and modeling, policy development, and program management across all functional areas of the OUSD (Acquisition & Technology) -- Space Policy, Environmental Security, Industrial Base Analysis, Acquisition Reform, Logistics, Research & Engineering, Strategic and Tactical Systems Acquisition, International Cooperation, Commercial Technology Insertion, Installations, Base Closure and Transitions, PPBS Improvements, and Nuclear / Chemical / Biological issues.

#### General Support for Director, (PA&E):

##### FY 1996 Accomplishments:

##### Part I. Current Agenda Issues:

##### Readiness and Quality of Life Monitoring

- Developed tools to relate resources to readiness, as well as analyses of the most cost-effective ways to meet our objectives for readiness and quality of life.
- Improved the FYDP data system to better understand the relationships.  
Infrastructure Downsizing

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	
Research, Development, Test & Evaluation, Defense-wide B/A 6		Technical Studies, Support & Analysis	February 1997
			PE 0605104D

- Developed tools/analytical frameworks addressing the need to downsize DoD's infrastructure
- Conducted analyses of the drivers of infrastructure costs.
- Followed-up on The Commission on Roles and Missions (CORM) emphasis on this theme, especially privatization and outsourcing initiatives.
- FYDP improvement project -- directly related to our ability to improve our analytical capabilities in the infrastructure area.
- Performed analyses to extend our understanding of the economies of DoD's infrastructure.
  - Long-Term Modernization
- Analytical efforts to gain a better understanding of long-term investment needs and equipment aging trends.
- Developed metrics to assess our needs in this area, as well as studies of specific investment areas and systems.
- Assessed DoD's post- 2000 resource needs to maintain the Bottom-Up Review force structure and modernize key investment areas.
- PA&E and A&T have jointly sponsored the Defense Program Projection (DPP) project to address modernization issues.
  - Support to the Acquisition Process
- Continuing analytical support for the defense acquisition process, including both the Defense Acquisition Board reviews and the MAISRC process, incorporating acquisition reform efforts.
  - Independent cost estimates prepared by the CAIG and the Cost and Operational Effectiveness Analyses overseen and reviewed by PA&E's program analysts. (Better cost and effectiveness tools, discussed below in Part II, also provide important support to the acquisition process.)
  - Development of improved methodologies to support our analysts.
- Congressional Mandates -- A number of reports are mandated each year by the Congress, for which PA&E was responsibility for preparation, including the annual responsibility sharing report.

Part II. Development of Analytic Tools.

- Provided critical research support for both DoD's Cost Analysis Improvement Group (CAIG) activities in support of the Defense Acquisition Board and other activities in support of the Secretary and the Deputy Secretary that require cost analyses, including the program review process and other special studies and reviews.
  - Through the CAIG, PA&E has a statutory responsibility to ensure that DoD develops realistic cost estimates of major weapon systems.
  - This legislation requires that the CAIG prepare independent cost estimates for these systems at prescribed milestones in the acquisition process.
- Strengthening of DoD's independent cost estimating capability.
  - CAIG uses parametric and other cost estimating the likely development, production, and O&S costs of major weapons systems.
  - These models use methodologies that are highly dependent on sound historical data and statistical methods.
  - Includes a strong research effort in the cost analysis area, with particular emphasis on the following current issues:
    - diminished industrial base,
    - software intensive functionality,
    - low observable technology,
    - the rapidly changing microelectronics environment,

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
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- cost impacts of acquisition streamlining initiatives, and
- operating and support cost estimating.
- Developed better tools to perform a wide range of required analyses including:
  - Cost and Operational Effectiveness Analyses for Defense Acquisition Board reviews, program review issues, support to Joint Warfare Capabilities Analyses(JWCAs), and other special studies such as mobility program analyses.
  - Begin replacement of tools badly outmoded in the post-Cold War environment, such as the effort to improve joint theater models (JAMIP/JWARS)
- Part III. General Support for PPBS Activities:
- Alternative planning scenario analyses
- Investigated follow-up of CORM recommendation for a Quadrennial Defense Review.

FY 1997 Initiatives (PA&E cont.):

Part I. Current Agenda Issues:

Infrastructure Downsizing

- Develop tools/analytical frameworks addressing the need to downsize DoD's infrastructure as directly related to the Quadrennial Defense Review (QDR), including such issues as outsourcing, lean logistics, and maintaining forces.
- Analyses of the drivers of infrastructure costs.
- Follow-up on emphasis on this theme, especially privatization and outsourcing initiatives.
- FYDP improvement project -- directly related to our ability to improve our analytical capabilities in the infrastructure area.
- Analyses to extend our understanding of the economics of DoD's infrastructure.

Readiness and Quality of Life Monitoring

- Develop tools to relate resources to readiness, as well as analyses of the most cost-effective ways to meet our objectives for readiness and quality of life.
- Comprehensive review of the compensation system, including medical benefits, pay and retirement annuities.

Long-Term Modernization

- Analytical efforts . of long-term investment needs and equipment aging trends, and the revolution in military affairs (also QDR related).
- Develop metrics to assess our needs in this area, as well as studies of specific investment areas and systems.
- Assess DoD's post- 2000 resource needs to maintain the QDR force structure and modernize key investment areas.
- PA&E and A&T have jointly sponsored the Defense Program Projection (DPP) project to address modernization issues.

Support to the Acquisition Process

- Continuing analytical support for the defense acquisition process, including both the Defense Acquisition Board reviews and the MAISRC process, incorporating acquisition reform efforts.
  - Independent cost estimates prepared by the CAIG and the Cost and Operational Effectiveness Analyses overseen and reviewed by PA&E's program analysts. (Better cost and effectiveness tools, discussed below in Part II, also provide important support to the acquisition process.)
- Development of improved methodologies to support our analysts.

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Forces

- Analyses of all aspects of U.S. force structure as related to the QDR.
- Assessment of the utilization and integration of reserve forces into the active structure.
- Future World and Projection of Threats
- Examination of longer-term security challenges.
- Perform additional regional assessments.
- Assess issues surrounding the proliferation of weapons of mass destruction
- Analyze the evolving world and the defense threats it poses.

Congressional Mandates -- A number of reports are mandated each year by the Congress, for which PA&E has responsibility for preparation, including the annual responsibility sharing report.

Part II. Development of Analytic Tools.

- Provide critical research support for both DoD's Cost Analysis Improvement Group (CAIG) activities in support of the Defense Acquisition Board and other activities supporting the Secretary and Deputy Secretary that require cost analyses, including the program review process and other special studies / reviews.
- Strengthening of DoD's independent cost estimating capability.
  - Through the CAIG, PA&E has a statutory responsibility to ensure that DoD develops realistic cost estimates of major weapon systems.
  - This legislation requires that the CAIG prepare independent cost estimates for these systems at prescribed milestones in the acquisition process.
- CAIG uses parametric and other cost estimating the likely development, production, and O&S costs of major weapons systems.
- These models use methodologies that are highly dependent on sound historical data and statistical methods.
- Includes a strong research effort in the cost analysis area, with particular emphasis on the following current issues:
  - software intensive functionality,
  - low observable technology,
  - the rapidly changing microelectronics environment,
  - cost impacts of acquisition streamlining initiatives, and
  - operating and support cost estimating.
- Develop better tools to perform a wide range of required analyses including:
  - Cost and Operational Effectiveness Analyses for Defense Acquisition Board reviews, program review issues, support to Joint Warfare Capabilities Analyses(JWCAs), and other special studies such as mobility program analyses.
  - Begin replacement of tools badly outmoded in the post-Cold War environment, such as the effort to improve joint theater models (JAMIP/JWARS)

FY 1998-1999 Plans: Evaluate readiness, quality of life, modernization, and infrastructure issues, critical in a downsized military, and as related to the Quadrennial Defense Review, outsourcing, lean logistics, and maintaining forces (active and reserve). Study long-term investment requirements, equipment aging

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trends, and the revolution in military affairs. Examination of future security challenges, regional assessments, weapons proliferation, and global defense threats in view of the changing world scene. Build/capitalize upon effectiveness tools such as theater models or other capability analyses to look at incremental costs, effectiveness, and relative contribution of planned acquisitions. Continue FYDP reform efforts. Provide tools essential for analyzing and providing support for the acquisition process in light of acquisition reform; continued cost analyses of the military medical delivery system; conduct independent cost and operational effectiveness of planned weapons systems; and improve techniques to better understand and project DoD infrastructure and requirements. Continue Congressionally mandated efforts. Continued development of cost research and analysis tools, with emphasis on issues of software intensive functionality, low observable technology, the rapidly changing microelectronics environment, cost impacts of acquisition streamlining initiatives, and operating and support cost estimating.

#### General Support for ASD(C3D):

##### FY 1996 Accomplishments:

- Developed a streamlined management plan for the Global Command and Control System (GCCS) that meets congressional oversight requirements and DoD policies, while ensuring rapid, effective, and evolutionary fielding.
- Provided systems engineering support to the US Mission to NATO on NATO and US information systems.
- Updated analysis of DoD security cost estimates--including costs of classification and declassification of classified material for submission to OMB
- Continued analysis and assessment of the information exchange among political and military decision makers leading to agreements on NATO expansion and partnership for peace.
- Analyzed and evaluated IW impacts to transportation, communications, power and industrial architectures for the US national infrastructure
- Developed a protective strategy for the US Government to employ in reducing the vulnerabilities to cyberspace attack of information systems including military and civilian physical and functional infrastructures..
- Identified key technology trends and determine how well the INFOSEC community has gauged device, system, and network protection capabilities against US exploitation and corruption technology.

##### FY 1997 Initiatives:

- Provide systems engineering support to the US Mission to NATO on NATO and US information systems.
- Update analysis of DoD security cost estimates, including costs associated with classification/declassification of classified material for submission to OMB.
- Conduct a series of "Day After" games that highlight US/coalition vulnerabilities to Information Warfare attack.
- Prepare country studies that evaluate the impact of information technology and Information Warfare on those countries and their regions (three regions).
- Develop a policy and integrated strategy framework for strategic Information Warfare.
- Identify DoD's current and near-term spectrum requirements to the year 2005.

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- Provide analytical support for the completion of a DoD C4I Surveillance and Reconnaissance Strategic Plan and provide planning support for implementing recommendations from the C4ISR Integrated Task Force.
  - Assess lessons learned from military operations pertaining to employment of C4ISR capabilities focused on land warfare.
- FY 1998 - 1999 Plans:
- Characterize emerging technology and its use in global communications given a hostile IW environment.
  - Develop a process to enhance the exchange of technologies between the offensive and defensive IW communities.
  - Continue to conduct the "Day After" games, expanding the scenarios to additional critical infrastructure.
  - Analyze IW impact on an extended campaign scenario.
  - Evaluate global impact of IW attack on various infrastructures.
  - Continue to study streamlining the oversight process for GCCS and other evolutionary automated information systems acquisition programs.
  - Continue technical support and analysis of the US roles in NATO C3 program in support of the US Mission to NATO.
  - Continue to provide security cost analysis for Defense.
  - Studies, analyses and management support for Command, Control Communications, Information System Security, NATO (C3), and Defense-wide-Intelligence program efforts related to research, development and defense planning in support of the Assistant Secretary of Defense (ASD) C3I. The ASD(C3I) technical programs consist of projects directly supporting the development of Defense -wide C3I policy, evaluation of existing and planned C3, counterintelligence, security countermeasures, systems and technology, analysis of potential worldwide C3 issues, management technologies, and other areas affecting medium and long range planning.

General Support for USD(P):

FY 1996 Accomplishments:

- Assessment of air operations over Bosnia since 1992, identifying lessons learned and implications for future military operations
- Continued research on the defense policy challenges facing NATO in extending membership to East Central Europe countries
- Continued analysis of the future potential threats and challenges posed by China and the outlook for Asian security
- Continued analysis of the Military Technical Revolution and the future security environment
- Counterproliferation issues: responses to threats in the Persian Gulf; the impact of NBC proliferation on alliance missions
- Further analysis on peacekeeping/peace operations -- how to improve the interagency planning and management of complex contingency operations
- Latin America: A post-Defense Ministerial Assessment
- Analysis of the future direction of Russian and the implications for US security strategy
- The future US-Japan security relationship

FY 1997 Initiatives: Policy will devote a substantial share of the FY 1997 study program to analysis in support of the Quadrennial Strategy Review. Policy requires a set of strategy review papers from knowledgeable outside experts while the ASD(S&R) works the issue from within. For example, we could use the

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budget as a base to see what force structures can be maintained and what strategies can be supported. Some alternatives being considered under this approach include:

- Direct a set of identical studies which assume a budget constrained environment and which test 2-4 different force structures against the strategies that those force structures could support. The challenge would be to identify the best force structure that we can afford for a particular strategy.
- Direct a set of identical studies that examine the basic allocation of resources between and among the military departments, between the mix of lower and higher technology force structure options, etc., and test those force structures against different strategies. The challenge here is to identify the best force structure that we can afford for a particular strategy.
- Direct a set of identical studies that question what we mean by "risks" and how do we measure them. Explore how we can best test different force structures against different strategy requirements. Can they be quantified?
- Direct a set of studies that examine how the "basket case states" need to be factored into our defense thinking -- in terms of training, O&M, personnel and force structure, etc.

The work would be done in coordination with other interested and affected offices within OSD, such as PA&E, A&T, Joint Staff. Besides the analytical work to support the strategy review, other projects include several regionally-focused studies on areas of critical concern to the US and its allies, such as:

- China's growth as a regional military power
- Instability on the Korean sub-continent
- Iran and Iraq and their impact on stability in the Middle East
- Russia and the former Soviet Union
- NATO expansion

Also of interest and concern is the problem of the proliferation of weapons of mass destruction and how best to deal with the problems posed by such weaponry. Peacekeeping and peace enforcement issues will remain high on the research agenda as well.

FY 1998-1999 Plans: Analysis will respond to the needs of DoD's senior leaders and the world situation at that time. Possible topics include the following:

- Continued analysis on strategy approaches and force postures.
- RMA (Revolution in Military Affairs) issues, including information warfare.
- Future world and regional assessments, including whatever "hot spots" and regional issues may be critical at the time.
- Alternative future worlds, the most likely threats, and how best to counter them (e.g., the problem of weapons of mass destruction).
- Further analysis on topics emerging from the strategy review.

#### General Support for USD(P&R):

FY 1996 Accomplishments:

- Assessed the effects of changes in military compensation and retirement system on force structure and productivity and performance.
- Field tested a survey instrument to measure propensity of currently serving military members to reenlist.

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- Examined trends in military recruiting to include the effects of changes in demographic, economical, psychological, and budgetary factors as Services' recruiting goals rise in FY 96 and FY 97.
- FY 93 Defense Authorization Act requirement. Assessed alternative officer career management systems. Issues addressed include length of career, mandatory retirement, "up or out" policies, and military pay.
- Assessed future enlisted force requirements in terms of service, skill goals, and experience mix, and identify personnel management policies that will yield a cost-effective match between future enlisted career members and requirements.
- Assessed the extent to which required military and civilian manpower levels are maintained as the DoD drawdown concludes and budget levels are reduced.
- Evaluated the JROTC Career Academy Program, which provides academic and vocational training, plus a special military course of instruction, for "at-risk" high school students.
- Collected data from military retirees to obtain information on income, quality of life, health care, and employment to determine whether military retirees are becoming better or worse off over time, as compared to their civilian peers.
- *Personnel and Family Support*
- Assessed the impact of child care, MWR, and other quality of life program on military families, to include the programs' purpose and utilization.
- Determined the impact of housing privatization.
- Examined the effects of major Quality-of-Life programs on retention satisfaction with military life, spouse employment, etc.
- *Civilian Personnel Policy*
- Developed a cost-effective DoD civilian manpower plan in the drawdown as budgets are constrained and military force levels decline. Issues addressed will include privatization, military-civilian substitution, and compensation.
- FY 95 Defense Authorization Act requirement. Designed a uniform health benefits program for DoD employees assigned to non-appropriated fund (NAF) components.
- *Reserve Force Utilization*
- Investigated the extent to which peacetime use of Reserves affects reserve Manning and retention, as well as active/reserve missions and budgets.
- Determined the cost-effectiveness of substituting Reserve for Active Duty NATO forces in Europe.
- *Equal Opportunity Policy*
- Analyzed the career opportunities of minority and female officers, with particular emphasis on promotion rates and timing.
- Provided expert research for the Defense Equal Opportunity Management Institute on equal opportunity and diversity issues by university faculty members.

FY 1997 Initiatives:

Military Personnel Policy

- Design and test a prototype force structure planning model to examine changes in force inventories as a result of changes in compensation as well as recruiting, retention, and separation incentives.
- Assess the effectiveness of housing military personnel and their families, and provide cost-effective alternatives to current housing policies.

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- Analyze the management of permanently non-deployable service members to determine if policy is sound, and consistent with other separation policies.
- Evaluate the effectiveness of civilian contracted telemarketing as a "tool" to generate military recruitment leads and enhance recruiting.
- Continue a survey measuring propensity of currently serving military members to reenlist. Determine retention behavior of pre-career and early-career enlisted service members and predict their propensity to both reenlist and to make a full career in the military.
- Continue assessment of trends in military recruiting to include the effects of changes in demographic, economic, psychological, and budgetary factors as Services' recruiting goals rise in FY97.
- Determine the effectiveness and costs of alternative mixes of national and local advertising--television, radio, and print--on military recruiting and evaluate the message conveyed.
- Examine the ways in which the military pay system and the non-pecuniary factors (quality of life, promotion policies, etc.) affect overall recruiting and retention (and individual performance) to determine the most cost-effective mix of compensation and personnel policies to meet force strength objectives.
- Analyze data from a survey of military retirees on income, quality of life, health care, and employment to determine whether military retirees are becoming better or worse off over time, compared to their civilian peers.
- *Personnel and Family Support*
  - Assess the impact of MWR, and other quality of life programs on military families, to include the programs' purpose and utilization.
  - Examine the impact on the military community of closing PX and Commissary facilities on BRAC installations.
- *Reserve Force Utilization*
  - Investigate the extent to which peacetime use of Reserves affects reserve manning and retention, as well as active/reserve missions and budgets.
  - Determine the cost-effectiveness of substituting Reserve for Active Duty NATO forces in Europe.
- *Equal Opportunity Policy*
  - Analyze the career opportunities of minority and female officers, with particular emphasis on promotion rates and timing.
  - Provide expert research for the Defense Equal Opportunity Management Institute on equal opportunity and diversity issues by university faculty members.
  - Develop improved measures and determine the causes of attrition from the Reserves.

**FY 1998-1999 Plans:** An underlying theme of the FY 1998-99 Program will be a concerted effort to continue to identify where budgetary savings without adversely affecting force readiness. Research will be sponsored which will recommend more efficient ways of managing the force and/or involve the actual curtailment/consolidation of particular activities and functions. Funds will be used to:

- explore new concepts in personnel and unit readiness for Active and Reserve Components;
- develop methods to improve the determination of the total force requirements for manpower;
- improve the technological capability of personnel systems to acquire, distribute, train, and utilize qualified personnel for Active and Reserve forces;
- evaluate alternatives for managing total force manpower; and
- monitor quality of life and equal opportunity of the force.

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General Support for the Joint Staff:

FY 1996 Accomplishments:

- Identifying and assessing the priority of joint military requirements
- Assist the Joint Requirements Oversight Council (JROC) in determining and improving joint readiness
- Evaluations of cost, schedule, and performance criteria of programs
- Assigning joint priority among existing and future programs to conform to resource levels projected by SECDEF through defense planning guidance

FY 1997 Initiatives:

- The Joint Warfighting Capabilities Assessment (JWCA) process assists the Joint Requirements Oversight Council (JROC) in providing recommendations to the Chairman of the Joint Chiefs of Staff (CJCS) in support of his statutory responsibilities to provide military advice to the Secretary of Defense on the priorities of military requirements. The JWCA teams additionally support the CJCS in assessing the extent to which the program recommendations and budget proposals of the military department and other components of the DoD conform with the priorities established in strategic plans and the priorities of the Combatant Commanders in Chief (CINCs). Furthermore, the JWCA teams propose alternative program recommendations and budget proposals, within the projected resource levels and guidance provided by the SECDEF, through the JROC to the CJCS in order to achieve greater with these priorities. The mission of the JROC, and its attendant JWCA process, were formalized in the 1996 Defense Authorization Act: (1) identifying and assessing the priority of joint military requirements including existing systems and equipment to meet the national military strategy; (2) considering alternatives to any acquisition program that has been identified to meet military requirements by evaluating the cost, schedule, and performance criteria of the program and of identified alternatives; (3) assigning joint priority among existing and future programs meeting valid requirements, and ensuring that the assignment of such priorities conforms to resource levels projected by the SECDEF through defense planning guidance.

FY 1998 - 1999 Plans:

- Quadrennial Defense Review (QDR) is one of the Chairman's top priorities and will determine the future of our armed forces for the next ten years.
- The Joint Warfighting Capabilities Assessment (JWCA) process assists the Joint Requirements Oversight Council (JROC) in providing recommendations to the Chairman of the Joint Chiefs of Staff in support of his statutory responsibilities to provide military advice to the Secretary of Defense on the priorities of military requirements. This process requires research in analysis supporting overall assessment of the ways in which the future national security environment will challenge or provide opportunities for research studies is to support more effective decision-making on issues of prime concern to joint warfighting of the United States military forces. Potential topics areas are:

Strike	Land and Littoral Warfare
Strategic Mobility and Sustainability	Sea, Air, and Space Support
Deterrence/Counterproliferation	Regional Engagement/Overseas Presence
C2	Information Warfare
Intelligence, Surveillance and Reconnaissance	Joint Readiness (Personnel)
Joint Readiness (Forces)	Joint Readiness (Exercises/Training)

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**B. Program Change Summary**

Previous President's Budget  
Appropriated Value  
Adjust to Appropriated Value/President's Budget  
Current Budget Submit/President's Budget  
Below Threshold Reprogramming  
Congressional Distributed & Undistributed Reductions

FY1996	FY1997	FY 1998	FY 1999
39.302	35.101	36.511	38.552
34.302	31.248		
-4.051	-1.546		
30.251	30.447	36.376	40.355
-1.700	0		
-2.351	-1.546		

Change Summary Explanation: Classified Program removed from the Program Element in FY 1996

Funding: FY 1996 and FY 1997 decreases for undistributed Congressional reductions and revised economic assumptions.

Schedule: N/A

Technical: N/A

**C. Other Program Funding Summary Cost**

N/A

**D. Schedule Profile**

N/A

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COST (In Millions)		FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Total Cost
Total Program Element (PE) Cost		2.464	2.673	2.690	2.777	2.869	2.960	3.023	3.095	Cont.
Critical Technologies Program P204		2.464	2.673	2.690	2.777	2.869	2.960	3.023	3.095	Cont.

A. (U) Mission Description and Budget Item Justification

## A1. (U) BRIEF OVERVIEW DESCRIPTION OF TOTAL PROGRAM:

(U) This program element supports development and publication of the Congressionally mandated Militarily Critical Technologies List (MCTL). The MCTL is the fundamental source document for identification of leading edge and current technologies which must be monitored and assessed world-wide for national security and nonproliferation control of weapons of mass destruction and advanced conventional weapons. Funds continuous technical support to interdepartmental and international processes which develop multinational control agreements on technologies of concern to DoD. Provides foreign technology

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A1. (U) BRIEF OVERVIEW DESCRIPTION OF TOTAL PROGRAM: (Continued)

assessments for the MCTL and other critical technologies efforts. Identifies and determines technical parameters for proposals for international control of weapons of mass destruction. Provides technical assessments to support treaty compliance inspections and decisions on foreign ownership of US industrial assets. Identifies foreign technologies of interest to the DoD and develops opportunities for international cooperative research and development. Includes funding for travel by OSD personnel in support of the management and technical objectives. This program element is responsive to time critical requirements established in interdepartmental and international processes required to meet Congressional mandates to identify, control, transfer and develop militarily critical technologies.

A2. (U) FY 1996 Accomplishments:

(U) In concert with Department of State provided leadership and technical support in the development of United States Government (USG) proposals for multinational negotiations at the Wassenaar Arrangement (successor to CoCom) to ensure continued control of technologies critical to US military and economic security. (\$.564 Million)

(U) Developed and published MCTL-Part 1 (Weapons Systems Technologies) and drafted MCTL-Part II (Weapons of Mass Destructions) (\$.5 Million)



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A2. (U) FY 1996 Accomplishments: (Continued)

(U) Developed proposals for Missile Technology, Nuclear and BW/CW export control regimes. (\$.4 Million)

(U) Produced MCTL based economic security and technical assessments to assist decision makers on revising US export and cooperative development policy.  
(\$.6 Million)

(U) In concert with industry, government and academia conducted assessments of dual use technologies to determine the militarily critical technology parameters. The assessments clearly highlight critical technologies and indicate liberalizing exports for some technologies. (\$.4 Million)

A3. (U) FY 1997 Plans:

(U) Develop control/decontrol proposals addressing DoD concerns for multinational negotiations for the Wassenaar Arrangement, Missile Technology, Nuclear and BW/CW export control regimes. (\$.623 Million)

(U) Provide on-site technical support at multinational negotiations for national security and nonproliferation regimes. (\$.3 Million)

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A3. (U) FY 1997 Plans: (Continued)

(U) Monitor and assess technologies worldwide and develop technology assessments to support national military and economic security actions. These assessments will reflect regional security concerns, effects of the proliferation of weapons of mass destruction and the rapid advancement of technology worldwide. (.750 Million).

(U) Update on an ongoing basis MCTL Part I, "Weapons Systems Technologies," and complete the development and publish MCTL Part II, "Weapons of Mass Destruction Technologies," and complete the development of MCTL Part III, "Critical Developing Technologies." (\$600 Million)

(U) Conduct MCTL-based assessments of the technological capabilities of selected foreign nations. These assessments will identify the capabilities of the nation concerned, analyze U.S. capabilities in similar technology areas and nominate candidates for cooperative activities. (\$400 Million)

A4. (U) FY 1998 Plans:

(U) Develop and publish an MCTL incorporating results of the assessments completed in FY 1997 and changes in multinational control regimes. (\$.710 Million)

(U) Monitor and assess technologies worldwide and develop technology assessments to support national military and economic security actions. These assessments will reflect

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A4. (U)FY 1998 Plans: (Continued)

security concerns, effects of the proliferation of weapons of mass destruction and the rapid advancement of technology worldwide. (\$.601 Million)

(U)Develop proposals for international control/decontrol of technologies for multinational negotiations for the Wassenaar Arrangement, Nuclear and BW/CW export control regimes. (\$.579 Million)

(U)Provide on-site leadership and technical support at multinational negotiations. (\$.5 Million)

(U)Identify and assess opportunities for joint technology programs with other nations and US industry which would enhance capabilities of US military systems. (\$.3 Million)

A5. (U)FY 1999 PLANS:

(U)Update the MCTL on an ongoing basis incorporating results of the assessments completed in FY 1998 and changes in multinational control regimes. (\$.530 Million)

(U) Monitor and assess technologies worldwide and develop technology assessments to support national military and economic security actions. These assessments will reflect

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A5. (U) FY 1999 Plans: (Continued)

treaty compliance, national security concerns, effects of the proliferation of weapons of mass destruction, and the rapid advancement of technology worldwide. (\$.620 Million)

(U) Develop proposals for international control/decontrol of technologies for multinational negotiations for the Wassenaar Arrangement, Nuclear and BW/CW export control regimes. (\$.550 Million)

(U) Provide on-site leadership and technical support at multinational negotiations. (\$.510 Million)

(U) Identify and assess opportunities for joint technology programs with other nations and US industry which would enhance capabilities of US military systems. (\$.567 Million)

A6. (U) JUSTIFICATION FOR BUDGET ACTIVITY ASSIGNMENT FOR THE PROGRAM ELEMENT:

(U) The program element is correctly classified in Budget Activity 6 because it provides operational technical support for the Office of the Under Secretary for Acquisition and Technology by identifying and assessing militarily critical technologies that may require protection under one of the multinational control regimes.

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A7. (U) ACQUISITION STRATEGY:

(U) The completion of the tasks detailed in this program element require technical analyses across a broad spectrum of technologies which are deemed critical to continuing US military superiority. These analyses provide the basis for: the Militarily Critical Technologies List (required by the Export Administration Act); economic and national security assessments of controls in specified technology areas; foreign technology assessments to support economic and national security policy decisions; development of export control proposals for negotiation at the New Forum and other multinational control regimes and the identification of international cooperation opportunities. The USD(A&T) provides the technical management and oversight but does not have the broad technical expertise required to accomplish these tasks. This breadth of technical knowledge can only be obtained from government, industry and academic community.

(U) These tasks are best performed by a Federally Funded Research and Development Center (FFRDC). An FFRDC can produce independent and objective analyses of multinational programs which require access to the proprietary technical data of US and foreign defense industries, the existence and nature of which must be kept secret from potential competitors. The required access to sensitive US government policies, and decision-making procedures concerning multinational defense critical technology programs, and the close collaboration with government agencies required to perform these tasks, would give a contractor the marketing intelligence necessary to position itself unfairly in future multinational technology markets.

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B. (U) Program Change Summary:

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>Total Cost</u>
Previous President's Budget	2.651	2.884	N/A	N/A	Cont.
Appropriated Value	2.651	2.884	N/A	N/A	
Adjustments to Appropriated Value/ Presidents Budget	-.182	-.141	N/A	N/A	
Current Budget Submit	2.464	2.673	2.690	2.777	Cont.

C. (U) Other Program Funding Summary: N/A

D. (U) Schedule Profile: N/A

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM					
RDT&E BA 6					FOREIGN MATERIEL ACQUISITION & EXPLOITATION PE 0605117D					
COST ( <i>In Millions</i> )	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	43.772	39.707	37.474	38.380	39.632	40.926	41.801	42.784	Continuing	Continuing
Project Name/No. and Subtotal Cost FMA&E/P411	43.772	39.707	37.474	38.380	39.632	40.926	41.801	42.784	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

**Brief Description of Element:** Funding provides for the acquisition and exploitation of foreign military equipment and military technology.

**Program Accomplishments and Plans:** The DoD Foreign Materiel Program acquires and exploits foreign materiel systems, subsystems, components, commercial items with military applications, and technologies as well as related technical and operational documents. Program details are classified. Information can be made available to properly cleared and authorized personnel.

The Foreign Materiel Program Review Board (FMPRB) approves annual Foreign Materiel Acquisition (FMA) lists that target high-priority foreign military materiel that is potentially acquirable. As targets of opportunity become available, materiel acquisition actions are handled with real-time responsiveness and obligation of funds.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM	
RDT&E BA 6	FOREIGN MATERIEL ACQUISITION & EXPLOITATION PE 0605117D	

<u>B. Program Change Summary</u>	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	Total Cost
Previous President's Budget	44.510	40.750	37.599	38.560	Continuing
Appropriated Value	44.510	40.750			
Adjustments to Appropriated Value					
a. Congressionally directed undistributed reduction	(.661)	(1.043)			
b. DoD Budget Adjustment	(.077)		(.125)	(.180)	
Current Budget Submit/President's Budget	43.772	39.707	37.474	38.380	Continuing

Change Summary Explanation: NA  
 Funding: NA  
 Schedule: NA  
 Technical: NA

C. Other Program Funding Summary Cost Not Applicable

D. Schedule Profile Not Applicable

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DATE February 1997

## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

BUDGET ACTIVITY

PE NUMBER AND TITLE

## 6 - Management Support 0605160D Counterproliferation Management

## Support

COST (In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	6322	8343	7047	8508	8431	8738	8925	9135	Continuing	Continuing
P529 Defense Against Paramilitary Threats	423	468	0	0	0	0	0	0	0	891
P541 Operational Plans and Exercises	945	940	0	0	0	0	0	0	0	1885
P542 CP Architecture Studies and Mgt/Oversight*	4954	5048	5133	6136	6080	5971	6099	6243	Continuing	Continuing
P545 Nuclear Matters	0	1887	1914	2372	2351	2767	2826	2892	Continuing	Continuing

\*P542 was titled Special Activities and Reports for FY 1995 and FY 1996.

**Mission Description and Budget Item Justification:**

In August 1994, DoD established the Counterproliferation Support Program specifically to address the DoD shortfalls in counterproliferation operational capabilities documented in the May 1994 Report to Congress titled *Report on Nonproliferation and Counterproliferation Activities and Programs*. Counterproliferation Support Program funds are used to leverage DoD acquisition programs to meet the counterproliferation priorities of the Commanders-in-Chief (CINCs) of the Combatant Commands and accelerate the deployment of enhanced capabilities to the field. Specifically, the goal of the Counterproliferation Support Program is to improve specific military counterproliferation capabilities by (1) building on ongoing programs in the Services, DoD agencies, Department of Energy and U.S. Intelligence; (2) focusing on the most critical counterproliferation shortfalls to address major gaps in deployed capabilities (as reflected in the CINCs' priorities and the Counterproliferation Review Committee's (CPRC) prioritized list of counterproliferation Areas for Capability Enhancements); (3) leveraging existing program funding to more rapidly field capabilities by accelerating the deliverables of DoD programs; (4) identifying and enhancing the development of high payoff technologies to accelerate capabilities to the warfighter; (5) identifying and promoting key non-materiel initiatives that complement technological advances; and (6) transitioning Counterproliferation Support Program projects to the Services as soon as practicable.

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Exhibit R-2 (PE 0605160D)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1997
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
6 - Management Support		0605160D Counterproliferation Management Support								P529	
COST (In Thousands)		FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
P529	Defense Against Paramilitary Threats	423	468	0	0	0	0	0	0	0	891
<p><b>A. Mission Description and Budget Item Justification</b></p> <p><b>Project P529 - Defense Against Paramilitary Threats:</b> Defense against paramilitary and terrorist Weapons of Mass Destruction (WMD) threats poses particularly difficult security requirements. Project 529 identifies and evaluates systems, force structure, and operational plans to enhance U.S. capabilities to defend against these threats. This project addresses the need to enhance the capability to defend key military facilities against paramilitary threats with WMD. Exercises and studies will be conducted to evaluate the current systems and force structure for this mission and to ascertain the vulnerabilities of protected WMD facilities.</p> <p><b>Acquisition Strategy:</b></p> <p><b>FY 1996 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>423 Initiated SOF base defense exercise program execution plan; assessed target factors; coordinated intelligence</li> </ul> <p>Total 423</p> <p><b>FY 1997 Planned Program:</b></p> <ul style="list-style-type: none"> <li>459 Execute SOF base defense exercises; test prototype techniques; assess execution of operation</li> <li>9 Small Business Innovation Research Program</li> </ul> <p>Total 481</p> <p><b>FY 1998 Planned Program:</b></p> <ul style="list-style-type: none"> <li>0 All activity under this project transferred to P535-SOF Counterproliferation Support beginning FY 1998.</li> </ul> <p><b>FY 1999 Planned Program:</b></p> <ul style="list-style-type: none"> <li>0 All activity under this project transferred to P535-SOF Counterproliferation Support beginning FY 1998.</li> </ul>											
Project P529										Exhibit R-2 (PE 0605160D)	

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1997

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

6 - Management Support

0605160D Counterproliferation Management Support

P529

**B. Project Change Summary**

FY 1997 President's Budget  
Appropriated Value  
Undistributed Congressional Adjustments  
FY 1998 President's Budget

FY 1996	FY 1997	FY 1998	FY 1999	Total Cost
475	496	0	0	971
497	468	N/A	N/A	N/A
-78	0	N/A	N/A	N/A
423	468	0	0	891

**C. Other Program Funding Summary**

Not applicable.

**D. Schedule Profile**

	FY 1996		FY 1997
1	2	4	2
	3	X	3
			4
			X

- SOCOM base defense exercises

Project P529

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Exhibit R-2 (PE 0605160D)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1997
BUDGET ACTIVITY	PE NUMBER AND TITLE										PROJECT
6 - Management Support	0605160D Counterproliferation Management Support										P541
	COST (In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
P541 Operational Plans and Exercises		945	940	0	0	0	0	0	0	0	1895
<p><b>A. Mission Description and Budget Item Justification</b></p> <p><b>Project P541 - Operational Plans and Exercises:</b> This project combines exercises between the Navy's Indian Head Explosive Ordinance Disposal (NEOD) units and the Army's Chemical/Biological Response Team (CBRT) to determine joint WMD incident capabilities and shortfalls. Selected EOD units train with existing equipment and prototypes at OCONUS locations as part of an ongoing technological evaluation program. These exercises increase the number of personnel exposed to advanced equipment and reduce the need to bring personnel to CONUS sites for evaluation and training. The exercises enable the US to have an in-theater rapid response capability for countering WMD threats. Technologies and procedures for the Nuclear Emergency Search Team (NEST) program that are relevant to the BW/CW problem will be analyzed and applied as appropriate to the development of hardware and training exercises.</p> <p><b>Acquisition Strategy:</b></p> <p><b>FY 1996 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>320 Developed requirements for OCONUS response hardware including staging locations and logistics and maintenance mechanisms</li> <li>95 Began coordination of OCONUS exercise and readiness sustainment activities</li> <li>76 Initiated CONUS exercise and readiness cycles</li> <li>454 Completed acquisition and forward deployment of CONUS assets</li> </ul> <p>Total 945</p> <p><b>FY 1997 Planned Program:</b></p> <ul style="list-style-type: none"> <li>210 Continue exercise and readiness sustainment activities</li> <li>565 Continue forward deployment of OCONUS/ CONUS EOD WMD response assets with logistics and maintenance in place</li> <li>140 Conduct shortfall assessments</li> <li>25 Small Business Innovation Research Program</li> </ul> <p>Total 940</p> <p>Project P541</p>											

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE February 1997

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

6 - Management Support

0605160D Counterproliferation Management Support

P541

**FY 1998 Planned Program:**

- 0 All activity under this project transferred to P535-SOF Counterproliferation Support beginning in FY 1998.

**FY 1999 Planned Program:**

- 0 All activity under this project transferred to P535-SOF Counterproliferation Support beginning in FY 1998.

**B. Project Change Summary**

	FY 1996	FY 1997	FY 1998	FY 1999	Total Cost
FY 1997 President's Budget	945	993	0	0	1938
Appropriated Value	995	940	N/A	N/A	N/A
Undistributed Congressional Adjustments	-50	0	N/A	N/A	N/A
FY 1998 President's Budget	945	940	0	0	1885

**C. Other Program Funding Summary**

Not applicable.

**D. Schedule Profile**

	FY 1996			FY 1997		
	1	2	3	4	1	2
Completed analysis of EOD mission				X		
DTRG evaluation for WMD mission				X		
Reqs for CONUS response hardware				X		
Completed CONUS exercise coordination				X		
Reqs for OCONUS response hardware					X	
OCONUS exercise coordination					X	
Initiate CONUS exercise/readiness cycles						X
Deployment of CONUS assets						X

Project P541

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Exhibit R-2 (PE 0605160D)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1997	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
6 - Management Support		0605160D Counterproliferation Management Support								P542		
COST (in Thousands)		FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost	
P542	CP Architecture Studies and Mgt/Oversight*	4954	5048	5133	6136	6080	5971	6099	6243	Continuing	Continuing	
<p>*P542 was titled Special Activities and Reports for FY 1995 and FY 1996.</p> <p><b>A. Mission Description and Budget Item Justification</b></p> <p><b>Project P542 - Counterproliferation Architecture Studies and Management/Oversight:</b> The Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs (ATSD(NCB)) has been designated by the Secretary of Defense as the OSD focal point for counterproliferation (CP) activities within the DoD. The ATSD(NCB) has assigned management responsibilities for the CP Support Program to the Deputy for Counterproliferation (DA-TSD(NCB) (CP)). This project provides essential technical, architectural, and integration support to the CP Support Program. The project will (1) conduct analyses and planning activities necessary for program development, project prioritization and management oversight; (2) prepare required program deliverables such as the annual CP Report to Congress and internal DoD and interagency documents; and (3) provide technical and analytical support to the established CP review groups, including the congressionally mandated Counterproliferation Program Review Committee (CPRC). This project provides the critical manpower necessary to support the DA-TSD(NCB) (CP) in conducting the day-to-day operations of the CP Support Program and in providing the required OSD management oversight as described in the CP Support Program's Program Management Plan.</p> <p><b>FY 1996 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>1100 Program management and planning support</li> <li>880 CP technical analyses support and acquisition program oversight support</li> <li>400 CP interagency and international program coordination and integration activities (CPRC, Nonproliferation and Arms Control Technology Working Group, conference preparation)</li> <li>2474 CP architectural studies and assessments:             <ul style="list-style-type: none"> <li>evaluation of biological detector sensitivity and operational concepts</li> <li>assessment of Long Range Biological Standoff Detection System (LR-BSDS) range-time response capability</li> <li>adaptation of computer modeling tools to study biological threats against ground forces in a Major Regional Contingency (MRC)</li> <li>initiated evaluation of hyper/multi/ultra spectral analysis for counterproliferation applications</li> <li>reviewed mobile target detection algorithms and operational concepts</li> <li>quick response assessment of contributions of selected DoD acquisition efforts to US military ability to counter WMD</li> </ul> </li> <li>100 Initiated development of a joint DoD/FBI training program to improve the US's efforts to deter possible proliferation and acquisition of weapons of mass destruction by organized crime organizations in Eastern Europe, the Baltic countries and states of the former Soviet Union.</li> </ul> <p>Total 4954</p>												

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1997

BUDGET ACTIVITY

## 6 - Management Support

PE NUMBER AND TITLE

0605160D Counterproliferation Management  
Support

PROJECT

P542

## FY 1997 Planned Program:

- 1150 Program management and planning support
- 1050 CP technical analyses support and acquisition program oversight support
- 400 CP interagency and international program coordination and integration activities (CPRC, Nonproliferation and Arms Control Technology Working Group, conference preparation)
- 2360 CP architectural studies and assessments:  
  - evaluation of biological detector sensitivity and operational concepts
  - develop analytical tools to perform trade-off assessments of contributions of selected DoD acquisition efforts to DoD counterproliferation capabilities
  - continue evaluation of hyper/multi/ultra spectral analysis for counterproliferation applications
  - develop plan for DoD role in acquisition of chemical/biological first responder capabilities
  - evaluate contributions of improved target planning tools and characterization of collateral effects on CINC counterproliferation capabilities
  - conduct trade-off analyses of selected acquisition programs contribution to counterproliferation capabilities
- 88 Small Business Innovation Research Program

Total 5048

## FY 1998 Planned Program:

- 1200 Program management and planning support
- 1075 CP technical analyses support and acquisition program oversight support
- 400 CP interagency and international program coordination and integration activities
- 2458 CP architectural studies and assessments:  
  - continue trade-off analyses of contributions of selected DoD acquisition efforts to DoD counterproliferation capabilities
  - assess impact of adversarial use of WMD on US campaign plans
  - assess alternatives to improve campaign operations in a WMD environment
  - complete evaluation of hyper/multi/ultra spectral analysis for counterproliferation applications
  - assess merits of candidate hard target kill technologies against WMD targets

Total 5133

Project P542

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Exhibit R-2 (PE 0605160D)

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1997

BUDGET ACTIVITY

PE NUMBER AND TITLE

**6 - Management Support**

**0605160D Counterproliferation Management Support**

PROJECT

P542

D. Schedule Profile

	FY 1996			FY 1997			FY 1998			FY 1999			
	1	2	3	4	1	2	3	4	1	2	3	4	
• Program management/ planning support	X	X	X	X	X	X	X	X	X	X	X	X	X
• CP Annual Report to Congress													X
• CP architectural studies and assessments		X		X				X		X			X
• Initiation of joint DoD/FBI training program				X									X

Project P542

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Exhibit R-2 (PE 0605160D)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1997
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
6 - Management Support		0605160D Counterproliferation Management Support								P545	
		FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
P545	Nuclear Matters	0	1887	1914	2372	2351	2767	2826	2892	Continuing	Continuing
<p><b>A. Mission Description and Budget Item Justification</b></p> <p><b>Project P545 - Nuclear Matters:</b> Nuclear weapons receive special consideration within OSD because of the political and military importance, their destructive power and the potential consequences of an accident or an unauthorized act. Consequently, nuclear weapons issues must receive senior level attention and action/support. Complex and demanding issues exist pertaining to stockpile levels and stockpile maintenance and stewardship in collaboration with the Department of Energy, especially in view of an aging stockpile and the moratorium on underground nuclear testing. Project 545 provides support for analysis and assessments of issues associated with the reliability, safety, security, transportation, command and control, maintenance, storage and sustainability of the enduring stockpile.</p> <p><b>FY 1996 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>0 Project start in FY 1997.</li> </ul> <p><b>FY 1997 Planned Program:</b></p> <ul style="list-style-type: none"> <li>380 DoD oversight of DOE stockpile stewardship activities to assure nuclear weapon revalidation, tritium supply, non nuclear testing, maintenance of the enduring stockpile</li> <li>200 Nuclear Weapons Council (NWC) support: analyses and assessments for preparation of the Annual Nuclear Weapons Stockpile Memorandum and Long Range Planning Assessment to the President, Annual Surety Report to the President, NWC Chairman's Annual Report to Congress and NWC Standing and Safety Committee actions</li> <li>200 Support activities for the ATSD(NCB) in the conduct of international fora such as Chairman of the NATO Senior Level Weapons Protection Group, participation in the Joint Theater Surety Management Group; technical exchanges with France, UK and Russia</li> <li>507 Support to DoD policy formulation on nuclear weapons safety, use control, survivability, certification, transportation and reliability to include DoD Directives and related documentation; perform analyses in preparation of the Annual Nuclear Weapons Deployment Request to the President</li> <li>200 Analyses/ support activities for senior level groups, such as the Joint Advisory Committee on Nuclear Weapons Surety and Nuclear Forces Security and Survivability Steering Group, that provide advice to the Secretary of Defense, ATSD(NCB) and Chairman of the Nuclear Weapons Council</li> <li>370 DoD support analysis for senior level management including training, safety, security and use control</li> <li>30 Small Business Innovation Research Program</li> </ul> <p>Total 1887</p> <p>Project P545</p>											

## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1997

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

6 - Management Support

0605160D Counterproliferation Management

P545

Support

Total 1887

## FY 1998 Planned Program:

- 405 DoD oversight of DOE stockpile stewardship activities
- 195 Nuclear Weapons Council support
- 200 Support activities for the ATSD(NCB) in the conduct of international fora
- 529 Support to DoD policy formulation on nuclear weapons safety, use control, survivability, certification, transportation and reliability
- 195 Analyses and support activities for senior level advisory groups
- 390 Support for management activities

Total 1914

## FY 1999 Planned Program:

- 500 DoD oversight of DOE stockpile stewardship activities
- 240 Nuclear Weapons Council support
- 290 Support activities for the ATSD(NCB) in the conduct of international fora
- 640 Support to DoD policy formulation on nuclear weapons safety, use control, survivability, certification, transportation and reliability
- 240 Analyses and support activities for senior level advisory groups
- 462 Support for management activities

Total 2372

## B. Project Change Summary

FY 1997 President's Budget  
Appropriated Value  
Undistributed Congressional Adjustments  
FY 1998 President's Budget

FY 1996	FY 1997	FY 1998	FY 1999	Total Cost
N/A	1995	1920	2383	Continuing
N/A	1887	N/A	N/A	N/A
N/A	0	N/A	N/A	N/A
N/A	1887	1914	2372	Continuing

## C. Other Program Funding Summary

Not applicable.

Project P545

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Exhibit R-2 (PE 0605160D)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE	February 1997
BUDGET ACTIVITY	PE NUMBER AND TITLE 0605160D Counterproliferation Management Support							
D. <u>Schedule Profile</u>	FY 1996				FY 1997		FY 1998	FY 1999
	1	2	3	4	1	2	3	4
• Analyses and support activities	X	X	X	X	X	X	X	X

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 Exhibit R-2 (PE 0605160D)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6				R-1 ITEM NOMENCLATURE SBIR PE 0605502D			
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000		
Total Program Element (PE) Cost	27.239	*	*	*	*		
SBIR Administration No. P-518	27.239	*	*	*	*		

\*2.5 percent of extramural RDT&E funds appropriated to the Office of the Secretary of Defense (OSD)

#### A. Mission Description and Budget Item Justification

**BRIEF DESCRIPTION OF ELEMENT:** Under the Small Business Innovation Research (SBIR) program, DoD and ten other federal agencies are required to allocate 2.5 percent of their extramural R&D budgets in FY 1997 and thereafter, to fund mission-oriented R&D projects at small technology companies. Congress recently reauthorized the SBIR program with broad bipartisan backing, based on DoD's finding that the program makes a significant contribution to the technological strength of our armed forces, as well as highly favorable reviews of the program by the GAO, the National Academy of Sciences, and other federal agencies. In addition, a DoD report to Congress in May 1996 found that "SBIR-developed technologies have resulted in significant improvements in U.S. military capabilities and major savings to the taxpayer." Funding for DoD's SBIR program is expected to be approximately \$500 million in FY 1997.

This program element funds OSD's portion of the DoD SBIR program. It represents 2.5 percent of the extramural RDT&E funds appropriated to OSD, and it funds R&D projects evaluated and selected by OSD.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE SBIR PE 0605502D	

**PROGRAM ACCOMPLISHMENT AND PLANS:**

FY 1996-2000: This program element funds early-stage R&D projects at small technology companies, in accord with the requirements of Public Law 102-564.

**B. Program Change Summary**

FY 1996 funding for this program element was \$27.239 million, which represents 2 percent of extramural RDT&E funds appropriated to OSD in FY 1996. Funding for FY 1997 through FY 2000 will be 2.5 percent of extramural RDT&E, in accord with Public Law 102-564.

**C. Other Program Funding Summary:** N/A

**D. Schedule Profile** N/A

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE					
RDT&E/BA 6					Program Element (PE) Name and No. CLASSIFIED PROGRAMS - C3I PE 0605710D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	.424	2.252	.357	.448	.653	.675	.689	.705	Continuing	Continuing
Project Name/No. and Subtotal Cost Classified Programs-C3I/P711	.424	2.252	.357	.448	.653	.675	.689	.705	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

**Brief Description of Element:** Funding provides for accomplishment of studies, assessments and technical evaluations of C4I programs and activities. Resources are used to support the C4I Integration Support Activity (CISA) efforts including the integration of C4 and intelligence programs and activities, the identification and resolution of national and tactical interoperability issues, and fostering joint Defense-wide support to military forces.

**Program Accomplishments and Plans:**

FY 1996 Accomplishments:

- Perform studies to determine future concepts and mixes of C4I capabilities (\$.299 Million)
- Intelligence Surveillance and Reconnaissance (ISR) analysis in support of the JROC (\$.125 Million).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 6	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. CLASSIFIED PROGRAMS - C3I PE 0605710D	

FY 1997 Plans:

- Perform Intelligence Surveillance and Reconnaissance (ISR) modeling and simulation to include modeling systems' performance, defining threat and target databases, and refining models to perform detailed analysis. (\$.896 Million)
- Perform analyses of Interoperability problems among C4I systems. Areas to be examined include problems with database exchange, technical interoperability, data/information transfer and communications interface. (\$.800 Million)
- Continue studies to determine future C4I architectures and Capabilities. Perform special studies directed to determine future concepts and future mixes of C4I capabilities to support the environment anticipated into the next century (\$.500 Million)
- Contribution to SBIR fund (\$.056 Million)

FY 1998 Plans:

- Continue studies to determine future C4I Architectures and Capabilities. Perform special studies directed to determine future concepts and future mixes of C4I capabilities to support the environment anticipated into the next century (\$.357 Million)

FY 1999 Plans:

- Continue studies to determine future C4I Architectures and Capabilities. Perform special studies directed to determine future concepts and future mixes of C4I capabilities to support the environment anticipated into the next century (\$.448 Million)

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## RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE  
February 1997APPROPRIATION/BUDGET ACTIVITY  
RDT&E/BA 6R-1 ITEM NOMENCLATURE  
Program Element (PE) Name and No.  
CLASSIFIED PROGRAMS - C3I  
PE 0605710D**B. Program Change Summary**

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	Total Cost
Previous President's Budget	2.411	2.311	.357	.450	Continuing
Appropriated Value	2.411	2.311			
Adjustments to Appropriated Value					
a. Congressionally directed undistributed reductions	(.005)	(.059)			
b. Below threshold reprogramming	(1.988)			(.002)	
c. DoD Adjustment	.006			.448	Continuing
Current Budget Submit/President's Budget	.424	2.252	.357		

## Change Summary Explanation:

Funding: Not Applicable  
Schedule: Not Applicable  
Technical: Not Applicable

**C. Other Program Funding Summary Cost** Not Applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6					R-1 ITEM NOMENCLATURE SBIR Administration PE 0605790D					
COST (In Millions)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	1.456	1.586	1.738	1.859	1.917	1.972	2.014	2.061	Continue	Continue
SBIR Administration No. P-518	1.456	1.586	1.738	1.859	1.917	1.972	2.014	2.061	Continue	Continue

#### A. Mission Description and Budget Item Justification

**BRIEF DESCRIPTION OF ELEMENT:** Under the Small Business Innovation Research (SBIR) program, DoD and ten other federal agencies are required to allocate a small percentage of their extramural R&D budgets to fund mission-oriented research projects at small technology companies. Congress recently reauthorized the SBIR program with broad bipartisan backing, based on DoD's finding that the program makes a significant contribution to the technological strength of our armed forces, as well as highly favorable reviews of the program by the GAO, the National Academy of Sciences, and other federal agencies. Funding for DoD's SBIR program is expected to be approximately \$500 million in FY 1997.

PE 0605790D is the only source of funds for the coordinated administration of the component SBIR programs within DoD, because the 1992 SBIR Reauthorization Act provided that "a Federal agency shall not use any of its SBIR budget...for the purpose of funding administrative costs of the program." PE 0605790D funds central elements of SBIR program administration that are required by law, including:

- Coordination, publication, and distribution of DoD's SBIR research solicitations as required by 15 U.S.C. 638(g)(2);
- Monitoring of DoD-wide SBIR program expenditures, to meet Congressionally-mandated reporting requirements in 15 U.S.C. 638(g)(8), (j)(2)(F), and (l)(2).
- Sponsorship of national SBIR conferences, are the only existing forum for small technology companies to interact directly with DoD's SBIR program managers, contracting officers, and technical personnel, and thereby learn how to prepare research proposals that will serve DoD's needs.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE SBIR Administration PE 0605790D		

These functions are central to the operation of the SBIR program and have been a standard part of the program since it was initiated at DoD in 1983.

## PROGRAM ACCOMPLISHMENT AND PLANS:

FY 1996 Accomplishments: This budget item funded the coordination and publication of three SBIR/STTR research solicitations, as well as their distribution to over 30,000 potential applicants. The solicitations are the means, prescribed by statute, through which DoD describes its research needs and solicits research proposals from small technology companies. This budget item also funded the monitoring of DoD-wide SBIR program expenditures, as required by law, as well as DoD's annual reporting to Congress and the Small Business Administration on the operation of DoD's SBIR program. And this budget item funded three national SBIR conferences each attracting 800-1000 companies, in which the companies met directly with DoD scientists, contracting officers, and program managers, and learned how to prepare SBIR proposals and design research projects that will serve the DoD mission. Finally, this budget item funded initiatives of the USD(A&T) to streamline the SBIR process and facilitate participation in the program by companies not used to doing business with the government. Such initiatives included the creation and distribution of an SBIR desk reference for DoD contracting officers and technical personnel, the establishment of an SBIR Help Desk (800/382-4634) for program participants, the creation of an SBIR Home Page, and other projects. (\$1.456 Million)

FY 1997 Plans: This budget item continues to fund the core administrative functions discussed above - coordination, publication, and distribution of the solicitations; monitoring and reporting on the DoD-wide operation of the program; and sponsorship of the national SBIR conferences. It also continues to fund the USD(A&T) initiatives to streamline the SBIR process (SBIR Desk Reference, SBIR Help Desk, SBIR Home Page). In addition, it is funding a USD(A&T) initiative to systematically measure the effectiveness of the SBIR program in stimulating the development of affordable, high-performance new products that benefit DoD. It is also funding a new initiative to enable DoD to monitor and evaluate the track record of multiple-award winners in commercializing their previous SBIR research in military and private sector markets. (\$1.586 Million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE SBIR Administration PE 0605790D	

FY 1998 Plans: This budget item will continue to fund the core administrative functions and USD(A&T) initiatives to streamline the SBIR process, measure the program's success, and monitor the track record of multiple-award winners. It will also fund a pilot initiative to evaluate the commercialization plans now required in all phase II SBIR proposals (commercialization in military and private sector markets). (\$1.738 Million)

FY 1999 - 2003: This budget item will continue to fund the core administrative functions (solicitations, monitoring of program expenditures and operations, national conferences), as well as initiatives, such as those discussed above, to streamline the SBIR process, measure the program's success, and generally improve the program's effectiveness in converting SBIR research into affordable, high-performance new products of benefit to DoD.

#### B. Program Change Summary

Previous President's Budget	FY1996	FY1997	FY1998	FY1999	Total
Appropriated Value	1.574	1.628			Cost
Adj. to Approp. Value/President's Budget	1.574	1.628			Cont.
Current Budget Submit	(.118)	(.042)			
	1.456	1.586	1.738	1.859	Cont.

#### Change Summary Explanation:

Funding: The change in funding in FY1996 is the result of undistributed Congressional reductions. The FY 1997 change is due to revised economic assumptions.

Schedule: N/A  
Technical: N/A

C. Other Program Funding Summary: N/A

D. Schedule Profile N/A

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1997
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D					
RDT&E/BA 7										
COST ( <i>In Millions</i> )	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	11.077	6.899	6.249	6.242	6.210	6.347	6.482	6.634	Continuing	Continuing
Project Name/No. and Subtotal Cost C3I Intelligence Programs/P481	11.077	6.899	6.249	6.242	6.210	6.347	6.482	6.634	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

**Brief Description and Budget Item Justification:** PE includes all resources and manpower in support of projects managed by the Intelligence Systems Support Office (ISSO) as directed by the ASD(C3I). ISSO was established on 5 July 1990 by the direction of the Deputy Secretary of Defense. ISSO provides program management for:

- Battlefield Information Collection and Exploitation System (BICES) Developmental Efforts
- Foreign Commercial Purchasing Program (FCP)
- Open House Program (OH)
- National Drug Intelligence Center (NDIC) for DoD
- Gulf States Counternarcotics Initiative (GSCI)
- Advanced Sensor Applications Program (ASAP) - See ASAP RDT&E Descriptive Summary for program details.
- Pacific Disaster Center (PDC)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D	

**Program Accomplishments and Plans:****FY 1996 Accomplishments:**

- Continue program and technical management of FCP program (0.40 Million)
- Continue program and technical management of the ASAP program (0.60 Million)
- Continue program and technical support to GSCI (0.60 Million)
- Support to Joint Intelligence related technology (JTO) initiatives, studies & assessments (0.10 Million)
- Developed classified counter-proliferation computer database system (0.20 Million)
- Continue expansion of NDIC to support additional DOJ personnel (0.20 Million)
- Continue LOCE development towards interoperability standards of DoDIIS community as used in Global Command & Control System (0.60 Million)
- Continue development of US national segment to BICES (0.65 Million)
- Continue support to US BICES Team (0.60 Million)
- Continue development of bilateral interfaces to US BICES TAV.2 (1.75 Million)
- Provide RADEOS support to Yugoslavia (2.00 Million)
- Program and technical support to DoD/Library of Congress OPEN HOUSE Initiative (1.30 Million)
- Continue support to the Pacific Disaster Center (2.00 Million)

**FY 1997 Plans:**

- Wind-up program and technical management of FCP program (0.25 Million)
- Continue program and technical management of the ASAP program (0.80 Million)
- Continue program and technical support to GSCI (0.70 Million)
- Continue System and Engineering Support to ISSO Program (0.50 Million)
- Integrate BICES pilot study results into US national segment (0.40 Million)
- Migrate US BICES nation segment to DoDIIS compliant architecture (0.45 Million)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D	

- Integrate CSE structure into US BICES program (2.18 Million)
- Continue support to US BICES Team (0.50 Million)
- Begin program and technical support to Information Warfare initiatives (0.25 Million)
- Continue support to DoD/Library of Congress OPEN HOUSE Initiative (0.50 Million)
- Continue support to the Pacific Disaster Center (0.25 Million)
- Contribution to SBIR fund (0.126 Million)

FY 1998 Plans:

- Continue program and technical management of the ASAP program (0.80 Million)
- Continue program and technical management of the Open House program (0.50 Million)
- Continue program and technical support to GSCI (0.90 Million)
- Continue program and technical support to Information Warfare initiatives (0.40 Million)
- Continue System and Engineering Support to ISSO Program (1.30)
- Integrate BICES pilot study results into US national segment (0.40 Million)
- Migrate US BICES nation segment to DoDIIS compliant architecture (0.45 Million)
- Integrate CSE structure into US BICES program (1.00 Million)
- Continue support to US BICES Team (0.50 Million)

FY 1999 Plans:

- Continue program and technical management of the ASAP program (0.86 Million)
- Continue program and technical management of the Open House program (0.50 Million)
- Continue program and technical support to GSCI (0.90 Million)
- Continue program and technical support to Information Warfare initiatives (0.47 Million)
- Continue System and Engineering Support to ISSO Program (1.30)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D	

- Integrate BICES pilot study results into US national segment (0.46 Million)
- Migrate US BICES nation segment to DoDIIS compliant architecture (0.45 Million)
- Integrate CSE structure into US BICES program (0.80 Million)
- Continue support to US BICES Team (0.50 Million)

C3I Intelligence Programs is in Budget Activity 7, Operational Systems Development because it is consistent with established DoD definitions for BA 7.  
Provide an acquisition strategy. Not Applicable

<u>B. Program Change Summary</u>	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	Total Cost
Previous President's Budget	9.517	7.081	6.271	6.272	Continuing
Appropriated Value	9.517	7.081			
Adjustments to Appropriated Value					
a. Congressionally-directed undistributed reduction.	(.440)	(.182)			
b. Reprogramming Action	2.000				
c. DoD Budget Adjustment			(.022)	(.030)	
Current Budget Submit/President's Budget	11.077	6.899	6.249	6.242	Continuing

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D	

Change Summary Explanation: NA

Funding: NA

Schedule: NA

Technical: NA

#### C. Other Program Funding Summary Cost

	To Total
FY1995 FY1996 FY1997 FY1998 FY1999 FY2000 FY2001 FY2002 FY2003 Compl Cost	

O&M, Defense-wide (PE 0305190D)

Project LOCE 14.838 3.345 Transferred to another PE in FY97

#### D. Schedule Profile

FCP:

- Completed training on SU-27 Aircraft
- Complete procurement of SA-10 Missile System
- Complete procurement of SA-10 Support System
- Acquisition of Chinese EM-52 Mine

3QFY96  
1QFY97  
3QFY97  
3QFY97

BICES:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D	

- Test TAV 1 network for IOC 2QFY96
- Development of national interface and database exchange software 4QFY96
- Migrate BICES Interface Development Module (IDM) to SHAPE 4QFY96
- Integrate BICES Target Architecture Version 2.0 2QFY97
- Expand Target Architectures to the Lower National Level 3QFY97
- Develop and implement National Contribution Database with Web Tools 4QFY97
- Development of BICES C4ISR TAV 3.0 HW/SW baseline & implement Lower National Level 2QFY98
- Integration of BICES TAV 3.0 C4ISR Functions with NATO 4QFY98
- Migrate U.S. GCSS, GCSS, DII, and COE standards to BICES 2QFY99
- Expand BICES network to Lower National Level and partners 2QFY00
- Develop and integrate information intranets and fusion centers 2QFY01

## PDC:

- Complete Initial Operating Capability (IOC) Design 1QFY96
- Hire, Train and Support Analysis Staff 3QFY96
- Expanded IOC Facility Design 4QFY96
- Complete IOC Expansion 2QFY97
- Integrate Analysis Tools 4QFY97
- Integrate DARPA Models 2QFY98
- Integrate National Information Products 2QFY98

## GSCI:

- Initiate Mississippi CN Center Upgrade 4QFY96
- Begin operational testing of inter-state system 4QFY96
- Establish state drug intelligence libraries for Open Source access 1QFY97

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D	

- Continue Operation Pipeline focus on highway interdiction efforts 1QFY97
- Develop connectivity architecture for expansion for additional states 2QFY97
- Establish connectivity between Georgia and Gulf States 3QFY97
- Continue analysis and integration of data base material for the four states 4QFY97
- Continue expansion of Gulf States network to include additional state & Fed assets 1QFY98

## NDIC:

- Provide Program Management and Engineering support for design and installation of the following tasks:
  - Completion of Automated Information System (AIS) Facility Upgrade 4QFY96
  - Complete Document Exploitation Branch system upgrade 1QFY97
  - Begin preparation for Firewall technology insertion 1QFY97
  - Completion of Phase 2 of Drug Group Model application (IOC) 2QFY97
  - Install Video Teleconferencing system 2QFY97
  - Completion of NDIC (Johnstown-Washington Liaison Office) Connectivity 2QFY97
  - Completion of Analytical Research Center (ARC) 3QFY97
  - Completion of Phase 3 of Drug Group Model application 4QFY97
  - Geospatial Information System Enhancements 1QFY98
  - DICE Integration 1QFY98
  - Asynchronous Transfer Mode Installation 1QFY98
  - Data Tagging Phase II 2QFY98
  - Free Text Management Enhancements 2QFY98
  - Firewall Technology Inserting 3QFY98
  - Internet/Intranet Development 3QFY98
  - Distance Learning Phase IV 4QFY98

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D	

Data Tagging Phase III	4QFY98
Document Management System	1QFY99
Free Text Management Enhancement	2QFY99
Data Tagging Phase IV	2QFY99
Future Automated Information System Analysis	3QFY99
Data Storage Management Analysis	4QFY99

## OPEN HOUSE:

• Completed installation of microfilming equipment in Lithuanian National Library	1QFY96
• Completed installation of second camera in National Library of Lithuania	2QFY96
• Installed equipment and trained staff at Central Military Archives in Warsaw, Poland	2QFY96
• Completed site survey and began installation and training in Czech Republic	3QFY96
• Perform site surveys at defense archives in Bucharest, Romania and Budapest, Hungary	4QFY96
• Perform installations in Bucharest, Romania and Budapest, Hungary	2QFY97
• Continued maintenance of current sites throughout FY 97	1QFY97
• Upgrade Moscow and St. Petersburg camera cradles for special formats	3QFY97
• Possible installation in Russian state archives in Moscow	4QFY97
• Continued maintenance of current sites throughout FY 98	1QFY98
• Plan for termination of European Processing site NLT	2QFY98
• Reposition camera to new libraries and Archives in Russia	4QFY98
• Continue maintenance, low level upgrades and replacements as required	4QFY99

Fiscal Year actual and planned events by quarter. N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D	

1	FY1995 2	3	4	1	FY1996 2	3	4	1	FY1997 2	3	4	1	FY1998 2	3	4
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Acquisition Milestones  
Engineering Milestones  
T&E Milestones  
Contract Milestones  
Other Program Events

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE
February 1997		
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER C3I INTELLIGENCE PROGRAMS/PE 0305190D/P481	
A. <u>Project Cost Breakdown</u>		
Project Categories	PY	CY
a. Salaries/Benefits	1,514	1,588
b. Primary Hardware Development	375	432
c. Ancillary Hardware Development		130
d. Development Support Equipment Acquisition	928	
e. Research Support Equipment Acquisition		
f. Software Development	1,888	1,104
g. Licenses		128
h. Systems Engineering		862
i. Training Development	800	582
j. Integrated Logistics Support	7	8
k. Quality Assurance	64	
l. Reliability, Maintainability & Availability		
m. Configuration Management	193	
n. Technical Data		200
o. Development Test & Evaluation	200	200
p. Operational Test & Evaluation		
q. Contractor Engineering Support	2,700	1,512
r. Government Engineering Support		
s. Program Management Support	1,628	200
t. Program Management Personnel		
u. Travel	160	165
v. Research Personnel	620	570
w. Miscellaneous (less than 15%)		
Total	11,077	6,899
		6,249
		6,242

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER	
RDT&E/BA 4	C3I INTELLIGENCE PROGRAMS/PE 0305190D/P481	
B. Budget Acquisition History and Planning Information		Not Applicable
Performing Organizations		
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date
	Performing Activity EAC	Project Office EAC
	Total Prior to PY	Budget PY
	Budget CY	Budget BY1
	Budget PY2	Budget to Complete
	Total Program	
Product Development Organization		
Support and Management Organizations		
Test and Evaluation Organizations		
Government Furnished Property		
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date
	Performing Activity EAC	Project Office EAC
	Total Prior to PY	Budget PY
	Budget CY	Budget BY1
	Budget PY2	Budget to Complete
	Total Program	

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NONMENCLATURE/PE NUMBER/PROJECT NUMBER C3I INTELLIGENCE PROGRAMS/PE 0305190D/P481	
Support and Management Property		
Test and Evaluation Property		
Subtotal Product Development		
Subtotal Support and Management		
Subtotal Test and Evaluation		
Total Project (should match fiscal resources shown on the R-2 for the project)		

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R-1 ITEM NO.

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## RDT&amp;E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE  
February 1997

## APPROPRIATION/BUDGET ACTIVITY

R-1 ITEM NOMENCLATURE/PE  
NUMBER/PROJECT NUMBER  
C3I INTELLIGENCE PROGRAMS/PE 0305190D/P481

RDT&amp;E/BA 7

C. Funding Profile	Fiscal Year actual and planned obligations and expenditures		CY Obs		BY1 Obs		BY2 Obs		PY Exp		CY Exp		BY1 Exp		BY2 Exp	
	PY Obs	CY Obs	BY1 Obs	BY2 Obs	PY Exp	CY Exp	BY1 Exp	BY2 Exp	PY Exp	CY Exp	BY1 Exp	BY2 Exp	PY Exp	CY Exp	BY1 Exp	BY2 Exp
PYQ1	1,742								460							
PYQ2	4,715								450							
PYQ3	1,670								240							
PYQ4	1,536															
PYTot	9,663								1,150							
CYQ1	1,414	3,228							928	435						
CYQ2		1,397							2,551	480						
CYQ3		1,577							1,458	490						
CYQ4		697							1,911	550						
CYTot	1,414	6,899							6,848	95594						
BY1Q1			3,027						1,109	834	600					
BY1Q2			1,716						1,025	1,040	700					
BY1Q3			693						945	2,320	830					
BY1Q4			583							750	826					
BY1Tot			6,019						3,079	4,944	2,956					
BY2Q1			230								1,005					
BY2Q2											720					
BY2Q3											800					
BY2Q4											768					
BY2Tot											3,293					
BY2+1Q1			230													1,030
BY2+1Q2																1,350
BY2+1Q3																1,560
BY2+1Q4																2,302
BY2+1Tot																6,242
Total of fiscal year	11,077	6,899	6,249	6,242	11,077	6,899	6,242	6,242								

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RDT&E BUDGET ITEM JUSTIFICATION PE SUMMARY		DATE
APPROPRIATION/BUDGET ACTIVITY		February 1997
RDT&E DEFENSE WIDE/BUDGET ACTIVITY 7		
		R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP)

COST (IN MILLIONS)	FY1996 *	FY1997 *	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete *	Total Cost *
Total PE Cost	600.653	469.335	636.657	446.343	317.959	288.503	274.589	287.746	continuing	continuing
Sub Project Name/No. and Subtotal Cost										
Tactical Unmanned Aerial Vehicles (TUAV)/ PE 0305204D	71.489	76.168	122.004	42.052	33.769	30.450	23.975	24.364	continuing	continuing
Sub Project Name/No. and Subtotal Cost										
Endurance Unmanned Aerial Vehicles (EUAVs)/ PE 0305205D	239.712	189.346	216.712	167.864	31.734	19.106	20.866	20.544	continuing	continuing
Sub Project Name/No. and Subtotal Cost										
Airborne Reconnaissance Advanced Development Program (ARAD)/ PE 0305206D	206.304	118.212	212.961	169.217	196.008	180.257	170.773	183.226	continuing	continuing
Sub Project Name/No. and Subtotal Cost										
Manned Reconnaissance Systems (MRS)/ PE 0305207D	29.924	27.259	26.784	11.133	6.027	5.895	6.041	6.199	continuing	continuing
Sub Project Name/No. and Subtotal Cost										
Distributed Common Ground System (DCGS), PE 0305208D	52.510	57.725	37.653	33.897	27.680	29.402	28.874	28.665	continuing	continuing
Sub Project Name/No. and Subtotal Cost										
DARP Integration and Support (DI&S), PE 0305209D	[18.584]** .714***	[19.200]** .625***	20.543	22.180	22.741	23.393	24.060	24.748	continuing	continuing
Quantity of RDT&E articles										

\* FY 97 and prior-year funds for these projects were justified under PE 0305154D.

\*\* Bracketed numbers are DARP Integration and Support requirements which were included as part of the individual projects in PE 0305154D for FY 1996 and FY 1997. Because these funds were included in the funded lines those individual projects, the dollars are presented here for informational purposes only and are not additive amounts for PE 0305209D.

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RDT&E BUDGET ITEM JUSTIFICATION PE SUMMARY		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP)
RDT&E DEFENSE WIDE/BUDGET ACTIVITY 7		

\*\*\* These funds pay for DARO civilian pay requirements and were previously included in the Airborne Reconnaissance Programs project, P525, as a separate sub-project, DARO Operations. Since DARO civilian pay costs are now funded in this new PE (0305209D), FY 1996 and FY 1997 DARO Operations costs were transferred from the Airborne Reconnaissance Programs line to the DARP Integration and Support line PE 0305209D.

**A. Mission Description and Budget Item Justification** The Defense Airborne Reconnaissance Program (DARP) provides for the development and acquisition of all joint Service and Defense-wide manned and unmanned airborne reconnaissance capabilities including sensors, data links, data relays, ground systems (including development of modifications to Service and Agency-unique ground systems) to ensure commonality and compliance with the overarching, unified airborne reconnaissance architecture and associated investment strategy. The DARP includes the Tactical Unmanned Aerial Vehicles (TUAVs) program (PE 0305204D) which funds tactical UAV's and the Tactical Control Station (TCS). The Endurance Unmanned Aerial Vehicle (EUAV) program (PE 0305205D) funds all endurance unmanned aerial vehicle development as Advanced Concept Technology Demonstrations (ACTDs). The Airborne Reconnaissance Advanced Development (ARAD) program (PE 0305206D) provides for advanced development functions and the associated master planning activities to ensure development and acquisition efforts satisfy warfighter needs in the face of changing threats and rapid advances in technology. The Manned Reconnaissance Systems (MRS) program (PE 0305207D) seeks to exploit emerging airborne reconnaissance integrated architecture and technologies for common application among manned reconnaissance platforms. The DARP also includes the Distributed Common Ground System (DCGS)(PE 0305208D) which is designed to receive, process, exploit, and disseminate multiple source, time-sensitive imagery, imagery products and imagery-derived intelligence reports. The resources necessary to carry out the DARO charter, including those activities necessary to build and maintain an overarching architecture, and to develop, coordinate, standardize, and oversee all DoD airborne reconnaissance programs are included in the DARP Integration and Support (DI&S) program (PE 0305209D). These funds also accomplish required project support, technical assessments, management analysis, financial and budgetary analysis and support, functions common to multiple DARP projects, and DARO security and administrative services. The resources for FY 1997 and prior years were included in the individual DARP projects, and are now justified in a single PE (0305209D) to more clearly identify the costs of accomplishing the DARO chartered responsibilities. The DARP is categorized as Budget Activity 7. It provides for the development and demonstration of technologies and capabilities in support of operational systems development.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D	

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	71.489	76.168	122.004	42.052	33.769	30.450	23.975	24.364	continuing	continuing
Total Project Cost/No. and Subtotal Cost	49.972	69.437	87.497	15.004	6.968	12.756	13.238	13.616	continuing	continuing
Outrider/CSD/P801										
Total Project Cost/No. and Subtotal Cost	21.517	6.731	34.507	27.048	26.801	17.694	10.737	10.748	continuing	continuing
Tactical Control System (TCS)/P802										
Quantity of RDT&E Articles	Outrider 6		Outrider 6							

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** The non-lethal tactical UAV systems for DoD provide warfighters with a dedicated capability for day/night aerial reconnaissance, surveillance and target acquisition (RSTA); intelligence; communications/data relay; electronic warfare; weather data collection to support combat operations; minefield detection; and nuclear, biological and chemical reconnaissance in limited adverse weather. Tactical UAVs provide ground and naval commanders with near-real-time reconnaissance capability for sustained, deep RSTA support, and combat assessment (CA). UAV support to the maneuver battalions and brigades incorporates downsized, portable equipment that is capable of rapid deployment, easy to operate and maintain with minimum manpower and training requirements, and capable of launch and recovery in a constrained operating environment. The shipboard capability supports the Naval task forces. UAVs are intended for deployment in environments where immediate feedback is necessary and manned aircraft are unavailable or excessive risk makes the use of manned aircraft ill advised. Current Hunter UAV assets support training and UAV commonality and interoperability efforts. The downsizing of the Hunter-unique ground control station (GCS) and ground data terminal (GDT) was discontinued since scalability requirements are captured in the Tactical Control System (TCS) to meet users' operational needs at multiple echelons. The Outrider Tactical UAV (TUAV) Advanced Concept Technology Demonstration (ACTD) provides a single UAV that moves towards meeting Joint Services tactical UAV requirements. The TUAV endurance objective is to provide three hours flying time on station at a distance of up to 200 kilometers. The baseline payload is electro-optical/infra-red (EO/IR). Growth payloads will expand TUAV RSTA capabilities. The basic ACTD includes risk mitigation efforts for

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
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RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

a Heavy Fuel Engine (HFE) and a UAV Common Automatic Recovery System (UAV CARS). The Outrider ACTD program will demonstrate Joint Services (Army, Navy, and Marine Corps) tactical UAV requirements culminating in each Service's Military Utility Assessment. Low Rate Initial Production (LRIP) and Initial Operational Test and Evaluation (IOT&E) addresses the ground based tactical UAV and plans a follow-on capability for shipboard operations through a Follow-on Test and Evaluation (FOT&E) program. In addition, efforts are underway to develop a common TCS to provide an interoperable capability for control of the spectrum of present and future tactical UAV air vehicles and payloads utilized by the military services for RSTA and CA. TCS will interface with the Medium Altitude Endurance (MAE) UAV systems. TCS is structured to develop concepts of operation in conjunction with warfighters, to transform the operational concepts into a technical architecture with technical performance parameters, to demonstrate key capabilities through a rapid prototyping and demonstration effort, and to conduct supporting analyses, simulations, and trade studies leading to production in FY2000. The Systems Integration Laboratory (SIL) is an integral part of the TCS development. The SIL allows the integration and simulation of air vehicles, payloads, and system upgrades prior to actual flight. Integration of software and hardware within this controlled laboratory environment reduces the cost of test and evaluation and the risks associated with actual flight test. The Common Systems Development (CSD) provides for system interoperability and commonality among UAVs. Efforts such as open architecture, payload development, joint logistics, and simulation and modeling continue to ensure reduced life cycle costs, improved supportability, and the exploitation of technological advancement having UAV application. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.



Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUA V) PE 0305204D
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	71.489	76.168	122.004	42.052	33.769	30.450	23.975	24.364	continuing	continuing
Total Project Cost/No. and Subtotal Cost	49.972	69.437	87.497	15.004	6.968	12.756	13.238	13.616	continuing	continuing
Quantity of RDT&E Articles	6		6							

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification:

**Brief Description of Element:** The Tactical Unmanned Aerial Vehicle (TUA V), "Outrider," provides Army brigades/battalions, USMC regiments/battalions, and Navy forces with dedicated day/night, reconnaissance, surveillance and target acquisition (RSTA) and intelligence. Outrider provides the tactical warfighting commander with critical battlefield information in the rapid cycle time required for success at the tactical level. The Joint Requirements Oversight Council (JROC) reassessed warfighter UAV priorities and reconfirmed the TUA V as the JROC's top UAV priority to meet Service requirements in JROCM 173-96, Unmanned Aerial Vehicles, 12 November 1996. The Outrider Advanced Concept Technology Demonstration (ACTD) system consists of four air vehicles, each configured with an electro-optic (EO)/infrared (IR) sensor payload, ground control equipment, including communications equipment and launch and recovery equipment, remote video terminal, two HMMWVs and a trailer, and one mobile maintenance facility for every three TUA V systems.

Common Systems Development (CSD) pursues the RDT&E of systems common to the tactical family of UAVs (Pioneer, Outrider, Predator), including growth payloads and subsystems; performs user demonstrations of emerging UAV technologies; manages UAV joint international programs; and provides cross-functional support in the areas of logistics, simulation, test, and operations research. CSD supports testing, common system integration, and subsystems development for UAVs, including the UAV Common Automatic Recovery System (UAV CARS) and the modular integrated avionics group (MIAG); and logistics initiatives to reduce life cycle costs, improve supportability, and exploit commercial/non developmental item (NDI) technology having UAV applications. CSD also provides user demonstration, integration, test, and qualification of JROC-prioritized growth payloads such as communication/data relay, electronic warfare, laser designator, and

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
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chemical/biological reconnaissance; demonstrates alternative UAV technologies and concepts, including vertical take off and landing (VTOL), and heavy fuel engines (HFE) for the family of tactical UAVs. International program efforts include cooperative RDT&E arrangements with major NATO and non-NATO allies, and provides day-to-day management and policy oversight regarding UAV export control and foreign military sales (FMS).

**Programs Accomplishments and Plans: (\$ in millions)**

**FY1996 Accomplishments: (\$49.972)**

The Department is pursuing a single tactical UAV system using an ACTD approach. Hunter and Maneuver were removed from the Major Defense Acquisition Program.

**JTUAV-Hunter/Hunter Shipboard**

- Sustained Hunter assets for concept development, integration, and initial operator/maintenance training
- Terminated the Hunter HFE initiative
- Began transition of Hunter assets to the Army
- Continued acceptance of Hunter LRIP systems
- Terminated Hunter/Shipboard development efforts

(The Department decided not to procure additional Hunter UAV systems beyond the seven LRIP systems)

**Outrider Tactical UAV (TUAV) (\$33.582)**

- Initiated development, integration and manufacture of six (6) TUAV ACTD systems, including hardware, software development, systems engineering, integration, and logistics support. ACTD contract was competitively awarded to Alliant Techsystems. Initiated planning for shipboard integration and user assessments (\$30.682)
- Obtained approval to initiate contract option for TUAV UAV CARS integration and Government directed heavy fuel engine (HFE) risk mitigation effort (\$2.900)

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#### Common Systems Development (\$16.390)

- Continued to develop UAV CARS baseline system architecture and recovery subsystem guidance and control algorithms; conducted flight test program, and conducted feasibility studies (\$1.016)
- Continued demonstration, integration and qualification flight demonstrations of growth payloads (communications/data relay, communications and radar intercept, communications and radar jammer, and laser designator/range finder) (\$2.202)
- Initiated qualification and integration of a common modular integrated avionics group (MIAG) suite for family of tactical UAVs (\$5.200)
- Continued common integrating procedures mission, T&E risk reduction, technology demonstration, and international programs including update of the joint operating procedures mission, T&E risk reduction, technology demonstration, and international programs including defense cooperative initiatives (\$5.812)
- Continued DARP Integration and Support (\$2.160)

#### FY1997 Plans: (\$69.437)

#### Outrider Tactical UAV (TUAV) (\$49.312)

- Continued development, integration and manufacture of TUAV ACTD systems including first flight, test; delivery of first three (3) ACTD systems, with two mobile maintenance facility equivalents; user training in system operation and maintenance; shipboard integration planning and support; and TCS interoperability planning/demonstrations (\$25.202)
- Supported user exercises and demonstrations including planning and preparations (\$9.685)
- Continued TUAV/UAV CARS integration and awarded demonstration contracts for HFE Risk Mitigation (\$11.474)
- Continued DARP Integration and Support (\$2.951)

#### Common Systems Development (\$20.125)

- Completed development of UAV CARS baseline system and Predator UAV CARS feasibility study (\$1.130)
- Continued limited demonstrations, integration, qualification, and flight demonstrations of growth payloads IAW JROC guidance (\$1.165)
- Completed qualification and integration of the MIAG suite for Pioneer and continued qualification for the family of tactical UAVs (\$2.500)
- Continued common, integration, test logistics, and international support efforts (\$4.503)
- Initiated Congressionally directed flight demonstration of VTOL UAV technology (\$14.077)

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**FY1998 Plans: (\$87.497)****Outrider Tactical UAV (\$83.298)**

- Complete TUA V ACTD including delivery of last three (3) ACTD systems, one (1) mobile maintenance facility; incorporate required system modifications including retrofit of ACTD systems; user training; system support; and TCS interoperability demonstrations (\$23.334)
- Support user land based and shipboard exercises and demonstrations (\$2.690)
- Continue with TUA V/UAV CARS integration and test, and HFE demonstrations (\$18.526)
- Transition to a formal acquisition program including LRIP for ground systems only approval for at least three (3) systems and OT&E planning (\$38.748)

**Common Systems Development (\$4.199)**

- Continue limited demonstrations, integration and qualification of growth payloads (\$2.00)
- Continue common, integration, test, logistics, and international support efforts (\$3.849)
- Complete Congressionally directed flight demonstration of VTOL UAV technology (\$.150)

**Obligation time frame for all FY98 funding is from Oct 97 - Dec 98**

**FY1999 Plans: (\$15.004)****Outrider Tactical UAV (\$9.806)**

- Complete operational testing and achieve a Full Rate Production (FRP) decision for ground systems (\$9.806)

**Common Systems Development (\$5.198)**

- Continue limited demonstration, integration, and qualification of growth payloads (\$1.511)
- Continue common, integration, test, logistics, and international support efforts (\$3.687)

**Obligation time frame for all FY99 funding is from Oct 98 - Dec 99**

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
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**Acquisition Strategy:**

**Tactical UAV:** The TUAV ACTD provides for the placement of systems in the hands of operational users as quickly as possible for use in demonstrations and exercises. The ACTD process provides users with the opportunity to assess the military utility of the system thereby becoming informed buyers and applying lessons learned in evolving system requirements. The TUAV ACTD contract was competitively awarded with industry being advised of the possibility of follow-on production buys should the ACTD system demonstrate a military utility sufficient to cause the users to request additional quantities of the system. To this end, the ACTD contract has an option for six (6) LRIP systems. The Outrider LRIP option (presently priced for six systems) will be exercised for 3 - 6 systems to support Full Rate Production (FRP) for ground-based capability. The ACTD will address Joint Services (Army, Navy, Marine Corps) tactical UAV requirements and will validate military utility for each Service. However, the LRIP and IOT&E will be for ground based systems only with the shipboard planned as a follow-on capability achieved through the FOT&E program. The contract will be renegotiated. These LRIP systems will support a FRP decision for ground systems only. The TUAV program will employ "cost as an independent variable" in acquiring any follow-on systems. In accordance with JROC direction, the estimated costs for the 33rd and 100th air vehicles with payloads have been established as \$350K and \$300K respectively.

**Common Systems Development (CSD):** The CSD promotes the maximum use of common and interoperable hardware, software, and non developmental items (NDI) technology in an effort to support Joint Service UAV operations, streamline maintenance/support, and reduce life cycle cost. It exploits technology advancements that have UAV application through integration demonstrations.

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**B. Program Change Summary**

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	<u>Total Cost</u>
Previous President's Budget	61.9	57.9	37.7	16.6	continuing
Appropriated Value	51.9	72.9			
Adjustments to Appropriated Value					
a. Undistributed Reduction	(5.1)	(2.7)			
b. Realignments	3.2	(.8)			
President's Budget Request	50.0	69.4	87.5	15.0	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Program change summaries for FY 1996 and FY 1997 apply only to the Outrider and CSD portions of the JTUAV program for these years. TCS has been broken out separately and shown in the TCS documentation of the new PE 0305204D.  
Change Summary Explanation:

Funding: Changes are due to Program Budget Decisions and programmatic decisions  
Schedule: N/A  
Technical: N/A

**C. Other Program Funding Summary Cost**

	<u>FY1996 *</u>	<u>FY1997 *</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	To Complete	Total Cost
Proc, DW	40.400			89.428	120.182	121.485	124.518	127.604	cont	cont
WPN, Navy		25.000								

\* FY 1997 and prior funding was justified as part of Program Element 0305154D.

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**D. Schedule Profile**

Fiscal Year actual and planned events by quarter

	FY1996*				FY1997*				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Outrider Tactical UAV</b>																
<b>Acquisition Milestones</b>																
TUAV ADM																
UAV CARS / HFE ADM																
LRIP Decision Ground-Based Capability																
FRP																
<b>Engineering Milestones</b>																
System Integration and Demonstration																
HFE Risk Mitigation & UAV CARS																
Integration																
<b>T&amp;E Milestones</b>																
First Flight																
OT&E Ground-Based capability																
<b>Contract Milestones</b>																
Outrider TUAV ACTD																

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

## Fiscal Year actual and planned events by quarter

[illegible]

## Engineering Milestones

	UAV CARS	Integration/Baseline	Payload	Demos
UAV CARS Integration/Baseline		X		X
Payload Demos		X	X	X

## Payload Qual/Flight test VTOL Flight Test

X X

## UAV CARS

[illegible]

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.



Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN			DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE		
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D/P801		

### Tactical Unmanned Aerial Vehicles (TUAV)

#### A. Project Cost Breakdown

	(\$ in millions)			
	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>
<b>OUTRIDER</b>				
1. Hardware/Software Development	30.977	28.453	58.273	4.706
2. Technical and Engineering Support	2.122	9.530	9.150	1.900
3. Management Support	0.300	0.800	1.200	1.000
4. Test & Evaluation and Demonstrations	0.000	9.529	11.900	1.500
5. Other	0.183	1.000	2.775	0.700
<b>Subtotal</b>	33.582	49.312	83.298	9.806

#### COMMON SYSTEMS DEVELOPMENT (CSD)

1. Hardware/Software Development	5.200	0.000	0.000	0.000
2. Hardware/Software Development/UAV CARS Integration	1.020	0.000	0.000	0.000
3. Technical and Management Support	7.496	3.687	3.849	3.993
4. Test & Evaluation Demonstrations	2.200	15.921	0.350	1.205
5. Other	0.474	0.517	0.000	0.000
<b>Subtotal</b>	16.390	20.125	4.199	5.198

#### **TOTALS**

	49.972	69.437	87.497	15.004
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\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Project costs for FY 1996 and FY 1997 apply only to the Outrider and CSD portions of the JTUAV program for these years. TCS has been broken out separately and shown in the TCS documentation of the new PE 0305204D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D/P801
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

### **B. Budget Acquisition History and Planning Information.**

## Performing Organizations

Contractor/ Government Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete *	Total Program *
<b>Product Development organizations</b>											
<b><u>Joint Tactical UAVs (JTUAV)</u></b>											
MICOM					11.144						11.144
RDEC					3.533						3.533
SIL MICOM					5.295						5.295
TRW					54.803						54.803
General Atomics					3.579						3.579
NAWC Dahlgren					2.700						2.700
Loral					4.017						4.017
MICOM Logistics					.407						.407
Other					5.724						5.724
	<b>JTUAV</b>	<b>Subtotal</b>			91.202						91.202
<b><u>Outrider TUAV</u></b>											
Alliant Tech Systems					13.601	30.977	18.000	38.379	3.416	continuing	continuing
MICOM						2.122	5.700	6.950	1.000	continuing	continuing
MICOM/RDEC							2.019	2.000		continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN						DATE February 1997
APPROPRIATION/BUDGET ACTIVITY						
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7						
R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D/P801						

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete *	Total Program *
SNC							.500	4.300	.990	continuing	continuing
NAWCAD						2.145		1.500	.500	continuing	continuing
TBD/Competitive Award						11.500		17.344	1.000	continuing	continuing
NAVSEA						.585			.585		
Other						.183	5.911	7.400	.500	continuing	continuing
	Outrider	Subtotal			13.601	33.282	46.360	77.873	7.406	continuing	continuing
<u>Common System Development (CSD)</u>											
MICOM					2.259						
PUI						2.300					
AMERIND					1.086	.600					
SIL MICOM					2.400						
Laser Astronics						2.900					
CCC							12.666				
IAI					1.031						
Other					13.385	4.186		.607	1.655	continuing	continuing
	CSD	Subtotal			20.161	9.986	12.666	.607	1.655	continuing	continuing
Prod Dev Org		Subtotal			124.964	43.268	59.026	78.480	9.601	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN											
APPROPRIATION/BUDGET ACTIVITY						R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D/P801			DATE February 1997		
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7											
Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Support and Management Organizations											
<u>Outrider TUAV</u>											
Other						.300	.800	1.200	1.000	continuing	continuing
<u>Common System Development</u>											
DARPA Integration & Support											
H.J. Ford					1.873	2.160	2.951	**	**	**	**
SAIC					1.792	1.480	1.900	1.592	1.543	continuing	continuing
FEDSIM						1.900					
Other						.639		1.900	1.900	continuing	continuing
	CSD	Subtotal			3.665	6.179	6.751	3.492	3.443	continuing	.639
Support & Management											
Test & Evaluation Organizations											
<u>Joint Tactical UAVs (JTUAV)</u>											
RTTC					1.000						1.000
OPTEC/Other					2.333						2.333
	JTUAV	Subtotal			3.333				4.443	continuing	

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

\*\* FY 1918 and outyear funds for DARPA I &amp; S are justified under PE 0305209D.

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## Exhibit R-3, RDT&amp;E PROGRAM ELEMENT/PROJECT COST BREAKDOWN

APPROPRIATION/BUDGET ACTIVITY		DATE February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		
R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D/P801		

Contract/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
<u>Outrider Tactical UAV</u>											
OPTEC/Other							.310	.500	.250	continuing	continuing
MCOTEA						.100		.200	.050	continuing	continuing
MICOM									.650	continuing	continuing
OPTEVFOR						.100	.100	.250	.100	continuing	continuing
EPG						.750	.750	.525	.050	continuing	continuing
YPG						1.500	1.500	1.250		continuing	2.750
	TUAV	Subtotal				2.760	2.725		1.100	continuing	continuing
<u>Common Systems Development</u>											
Other					.235	.225	.100	.100	.100	continuing	continuing
Test & Evaluation					3.568	.225	2.860	2.825	1.200	continuing	continuing
GFE Organizations											
<u>Outrider Tactical UAV</u>											
Other								1.500	.300	continuing	continuing
								1.500	1.500	continuing	continuing

GFE      \* Subtotal  
 \* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D/P801	

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Product Development Subtotal					124.964	43.268	59.026	78.480	9.061	continuing	continuing
Support and Management Subtotal					3.665	6.479	7.551	4.692	4.443	continuing	continuing
Test & Evaluation Subtotal					3.568	.225	2.860	2.825	1.200	continuing	continuing
Government Furnished Property Subtotal					.000	.000	.000	1.500	.300	continuing	continuing
Miscellaneous Subtotal											
PROJECT TOTAL					132.197	49.972	69.437	87.497	15.004	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Tactical Unmanned Aerial Vehicles (TUAUV) PE 0305204D	

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	71.489	76.168	122.004	42.052	33.769	30.450	23.975	24.364	continuing	continuing
Total Project Cost/No. and Subtotal Cost	21.517	6.731	34.507	27.048	26.801	17.694	10.737	10.748	continuing	continuing
Tactical Control System (TCS)/P802										
Quantity of RDT&E Articles										

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** The Tactical Control System (TCS) provides interoperability and commonality for mission planning and control for the current and future family of tactical and Medium Altitude Endurance (MAE) UAVs. TCS provides users scaleable UAV functionality with a common core operating environment to receive, process, and disseminate UAV payload data from two or more different UAV types to support reconnaissance, surveillance, and combat assessment (CA); provides seamless integration into the existing Command, Control, Communication, Computer for Intelligence (C4I) architecture, provides users information superiority through cross cueing. TCS also maximizes off-the-shelf, existing Service computer platforms compliant with Joint Technical Architecture (JTA) and Common Imagery Ground/Surface Station (CIGSS) standards; and United States Imagery Standards. TCS provides flexibility for Services to choose scaleable UAV functions from receipt of imagery to full UAV command and control on their existing Service computing platforms and commercial off the shelf (COTS) hardware provides for flexible support of Service operational environments from land based shelters, Tactical Operations Centers (TOCs), or special operations operator transportable hardware, to seamless integration into existing sea based computing platforms. TCS utilizes the UAV Systems Integration Lab (SIL) to assess system integration readiness prior to actual flight test. The SIL provides for hardware in the loop tests of payloads, air vehicles (A/V) performance upgrades and joint interoperability interface integration prior to flight test; and provides live and virtual simulations for exploration of user UAV concept of operations (CONOPS) and participation of UAVs in advanced warfighting exercises.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**Programs Accomplishments and Plans: (\$ in millions)**

**FY1996 Accomplishments: (\$21.517)**

- Established the TCS development to provide a single ground control system (CGS) to support tactical UAVs, Predator (MAE UAV), and interfaces with High Altitude Endurance UAVs & C4I systems (\$11.689)
- Incorporated SIL, systems engineering, and open architecture efforts, systems integration, and software development and continued refinement of joint interoperability interface (JII) standards (\$6.028)
- Initiated, defined, and developed interoperability with MAE UAV and Outrider UAVs with ground control, information processing, exploitation, and dissemination systems (\$3.800)

**FY1997 Plans: (\$6.731)**

- Continued TCS system design, development, and implementation of TCS architecture (\$2.927)
- Continued refinement of JII standards for TUAV Outrider, Predator and other future UAV platform interoperability (\$.500)
- Continued rapid prototyping, system integration, test, simulation and interoperability efforts at the SIL (\$1.000)
- Conducted limited TCS prototype demonstrations including receipt and dissemination of Predator/Outrider data (\$1.100)
- Continued preparation and limited participation, if feasible at Advanced Warfighting and Service exercises for refinement of operational requirements/CONOPS (\$1.104)
- Participated in International NATO Standards Study (\$.100)

**Obligation time frame for all FY97 funding is from Oct 96 - Dec 97**

**FY1998 Plans: (\$34.507)**

- Continue prototype demonstrations of land and sea-based TCS including mission planning, air vehicle, and payload control of Predator and TUAV (\$8.087)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	DATE
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D	February 1997

- Continue TCS evolutionary development, engineering and integration efforts to include demonstration of scaleability, portability, mission planning and C4I integration (\$14.300)
- Continue documentation of system requirements (\$2.120)
- Continue SIL rapid prototyping, simulation and modeling, systems integration and interoperability and test including establishment of a development baseline (\$6.000)
- Continue participation in joint warfighting experiments and Service exercises for refinement of CONOPS (\$4.000)

**Obligation time frame for all FY98 funding is from Oct 97 - Dec 98**

**FY1999 Plans: (\$ 27.048)**

- Mature and refine system design through continued DT, OT, and demonstrations of land and sea-based TCS including multiple control of either Predator and TUAV Outrider Air Vehicles (\$7.237)
- Continue TCS evolutionary development; validation of manufacturing and production; engineering, and integration efforts to include demonstration of scaleability, portability, and mission planning; and logistics efforts including approval and execution of a Low Rate Initial Production (\$10.111)
- Continue SIL rapid prototyping, simulation and modeling, systems integration and interoperability tests (\$4.500)
- Continue participation in joint warfighting experiments and Service exercises for refinement of CONOPS (5.200)

**Obligation time frame for all FY99 funding is from Oct 98 - Dec 99**

**Acquisition Strategy:** The TCS was initiated to enable interoperability between the Services and their UAV systems to allow for proliferation of UAV information to all Services battleforce levels scaled to the users varying needs. TCS provides the common software architecture between MAE UAV, TUAV and future tactical UAVs and provides seamless integration into the existing Service C4I systems. The major focus of TCS is to provide a scaleable system architecture in compliance with Joint Technical Architecture (JTA) and open system standards capable of being hosted on computers that are typically supported by the using service. TCS provides for UAV interoperability and commonality and eliminates the proliferation of unique, non-interoperable stovepipe architectures of current UAV ground system components in the Services battleforce structure. TCS provides a cost effective and efficient means to open the battleforce to UAV information across the

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D

UAV family types. The TCS Operational Requirements Document (ORD) requires Initial Operational Capability (IOC) 1QFY00 and Full Operational Capability (FOC) 1QFY01.

#### B. Program Change Summary

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	Total Cost
Previous President's Budget	21.5	6.7	11.5	12.0	continuing
Appropriated Value	21.5	6.7			
Adjustments to Appropriated Value					
a. Undistributed Reduction					
b. Realignments					
President's Budget Request	21.5	6.7	34.5	27.0	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Program change summaries for FY 1996 and FY 1997 apply only to the TCS portion of the JTUAV program for these years. Outrider and CSD have been broken out separately and shown in the Outrider/CSD documentation of the new PE 0305204D.

#### Change Summary Explanation:

Funding: Changes are due to Program Budget Decisions and programmatic decisions.  
 Schedule: N/A  
 Technical: N/A

#### C. Other Program Funding Summary Cost

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	To Complete	Total Cost
N/A										

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUA/V) PE 0305204D
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	

#### **D. Schedule Profile**

**Fiscal Year actual and planned events by quarter**

	<u>FY1996*</u>				<u>FY1997*</u>				<u>FY1998</u>				<u>FY1999</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Acquisition Milestones</b>																
TUAV ADM (TCS)	X															
ORD Approved							X									
LRIP															X	
<b>Engineering Milestones</b>																
SIL (System Integration/Test)	X															
Predator/Outrider Interoperability		X														
<b>Contract Milestones</b>																
Predator/Outrider Interoperability				X												
<b>Other Program Events</b>																
TCS Capability for Predator/Outrider																
Receive Payload Data								X								
Mission Plan													X			
AV Control															X	
C4I Integration									X							
Demos									X							

\*FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D/P802	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

Tactical Control System (TCS)

A. Project Cost Breakdown

	(\$ in millions)		
	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>
			<u>FY1999</u>
1. Hardware Development	3.350	0.700	2.000
2. Software Development and Integration	6.800	2.589	16.300
3. Technical Support and Program Management	2.950	0.738	4.100
4. Interface Development	1.900	0.500	4.000
5. Test, Evaluation & Demonstrations	4.219	1.100	4.620
6. Exercise/Other	2.298	1.104	3.487
<b>TOTALS</b>	21.517	6.731	34.507
			27.048

\* FY 1997 and prior funding was justified as part of Program Element 0305154D. Project costs for FY 1996 and FY 1997 apply only to the TCS portion of the JTUAV program for these years. Outrider and CSD have been broken out separately and shown in the Outrider/CSD documentation of the new PE 0305204D.

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## Exhibit R-3, RDT&amp;E PROGRAM ELEMENT/PROJECT COST BREAKDOWN

APPROPRIATION/BUDGET ACTIVITY		DATE February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		
R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUA V) PE 0305204D/P802		

**B. Budget Acquisition History and Planning Information**Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
<b>Product Development Organizations</b>											
TRW						4.252					4.252
MICOM						2.096					2.096
Draper/SAIC						3.554					3.554
SEIA								1.500	5.200	continuing	continuing
RDEC/SIL/MICOM						2.526	.971	6.100	4.500	continuing	continuing
NSWC Dahlgren						4.189	2.900	11.500	11.500	continuing	continuing
General Atomics						1.800	1.067	.900	.500	continuing	continuing
Alliant TechSystems						1.500	.300	.800	.400	continuing	continuing
APL						.600		2.800	.800	continuing	continuing
Other Demos							1.493	9.907	3.148	continuing	continuing
<b>Product Development Organizations</b>	<b>Subtotal</b>					20.517	6.731	33.507	26.048	continuing	continuing
<b>Support and Management Organizations</b>											
<b>Test and Evaluation Organizations</b>											
Other						1.000		1.000	1.000	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN									
APPROPRIATION/BUDGET ACTIVITY						R-1 ITEM NOMENCLATURE			
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7						Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D/P802			

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Product Development Subtotal						20.517	6.731	33.507	26.048	continuing	continuing
Contractor Support Subtotal											
Support & Management Subtotal											
Test & Evaluation Subtotal						1.000		1.000	1.000	continuing	continuing
Government Furnished Property Subtotal											
Miscellaneous Subtotal											
PROJECT TOTAL						21.517	6.731	34.507	27.048	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	239.712	189.346	216.712	167.864	31.734	19.106	20.866	20.544	continuing	continuing
Project Name/No. and Subtotal Cost Global Hawk (CONV HAE)/P804	55.946	72.559	95.992	64.621	19.072	7.739	7.876	7.079	continuing	continuing
Project Name/No. and Subtotal Cost DarkStar/(LO-HAE)/P805	68.297	54.997	54.644	37.888	4.545	3.582	3.582	3.585	continuing	continuing
Project Name/No. and Subtotal Cost Predator (MAE)/P806	65.816	5.809	14.990	4.435	4.299	4.203	4.306	4.415	continuing	continuing
Project Name/No. and Subtotal Cost HAE Common Ground Segment/P807	49.653	55.981	51.086	60.920	3.818	3.582	5.102	5.464	continuing	continuing
Quantity of RDT&E Articles	LO-HAE 2 MAE 3 HAE COM 1	CONV HAE 2 LO-HAE 2 HAE COM 1	HAE CONV 4 HAE COM 1							

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** This program includes the Medium Altitude Endurance (MAE) - Predator; Conventional High Altitude Endurance (CONV HAE) - Global Hawk; Low Observable High Altitude Endurance (LO HAE) - DarkStar; HAE UAV Common Ground Segment (CGS) and associated support items. These systems will provide all-weather, day/night, reconnaissance and surveillance in direct support of the Joint Forces Commander. They integrate existing airborne reconnaissance architectures for mission planning, data processing, exploitation and dissemination. These projects are or were Advanced Concept Technology Demonstrations (ACTDs). Predator is in the process of transitioning from an ACTD to a formal acquisition program, the first ACTD to be so nominated. These projects are categorized as Budget Activity 7 because they provide technologies and capabilities in support of operational system development.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION				DATE
APPROPRIATION/BUDGET ACTIVITY			R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7			Endurance Unmanned Aerial Vehicles (EUAV)	
			PE 0305205D	

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	239,712	189,346	216,712	167,864	31,734	19,106	20,866	20,544	continuing	continuing
Total Project Cost/No. and Subtotal Cost Global Hawk (CONV HAE)/P804	55,946	72,559	95,992	64,621	19,072	7,739	7,876	7,079	continuing	continuing
Quantity of RDT&E Articles		2	4							

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** The High Altitude Endurance (HAE) UAV Advanced Concept Technology Demonstration (ACTD) program consists of two types of air vehicles, the Conventional HAE (CONV HAE) - Global Hawk and a Low Observable HAE (LO HAE) - DarkStar, and a Common Ground Segment (CGS), common and interoperable with both types of air vehicles (A/Vs). The DarkStar and HAE UAV Common programs are documented separately. The objective of the program is to place the assets in the hands of the warfighter as quickly as possible to assess the utility of the system in the context of military exercises with other Service/Theater systems. The execution of the Global Hawk program is dependent on funding of the HAE UAV Common program which contains the ground segment RDT&E, and developmental and demonstration support funding for both Global Hawk and DarkStar A/Vs. The Global Hawk will provide continuous, all-weather, day/night, wide area reconnaissance and surveillance in direct support of the Joint Forces Commander. The system consists of aircraft, sensors, communications and interfaces to theater systems to support tactical warfighters at various levels of command. The Global Hawk will be a fully automatic, high altitude, long endurance unmanned aircraft that is directly responsive to Theater force tasking. The Global Hawk will integrate with the existing tactical airborne reconnaissance architectures for mission planning, data processing, exploitation, and dissemination. It will provide both wide area search radar and Electro Optical (EO) or Infrared Radar (IR) imagery (40,000 sq nm per mission) at 1m resolution and up to 1900 spot images per mission at 0.3m resolution, and will support targeting accuracy of at least 20m CEP. The Global Hawk is the primary "workhorse" of the HAE UAV ACTD system and will be capable of supporting an estimated 80 percent of all military HAE UAV operational reconnaissance needs. It will be designed for long endurance, high altitude, standoff, image collection capabilities.



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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	

The Global Hawk will operate in low-to-moderate air defense threat environments with the ability to fly above, standoff, and look into high threat areas. This project is categorized as Budget Activity 7 because it provides for technologies and capabilities in support of operational system development.

**Program Accomplishments and Plans: (\$ in millions)**

**FY1996 Accomplishments: (\$55.946)**

- Conducted detailed design and final design reviews of developmental A/V (\$17.453)
- Began fabrication of developmental Global Hawk A/Vs (#1 and #2) with payloads (\$24.124)
- Commenced first UAV systems integration without sensor payloads (\$7.945)
- Initiated flight test preparation (\$4.637)
- Continued DARP integration and support (\$1.787)

**FY1997 Plans: (\$72.559)**

- Complete system integration and testing with full sensor payload on A/Vs (#1 and #2) (\$30.998)
- Complete fabrication of second sensor payload (\$10.380)
- Commence developmental flight and system performance tests (includes SAR, EO/IR and communication payload components) (\$7.471)
- Initiate long lead and fabrication of two demonstration A/Vs (#3 and #4) (\$12.000)
- Continue development and integrate design updates (\$8.000)
- Continue DARP integration and support (\$3.710)

**Obligation time frame for all FY97 funding will be from Oct 96 - Dec 97**

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**FY1998 Plans: (\$95.992)**

- Continue development and integrate design updates (\$10,000)
- Continue fabrication and integration of the demonstration A/Vs (#3 - #8) (\$44,000)
- Provide contractor participation in test and evaluation of military utility (\$18,492)
- Provide contractor fabrication, demonstration and evaluation support (\$18,000)
- Upgrade System Integration Laboratory (SIL) (\$5,500)

**Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98**

**FY1999 Plans: (\$64.621)**

- Continue and complete fabrication and integration of the final demonstration A/Vs (\$25,000)
- Provide contractor participation in test and evaluation of military utility in joint exercises (\$ 22.621)
- Provide contractor fabrication, demonstration and evaluation support (\$17,000)

**Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99**

**Acquisition Strategy:** The HAE system will be procured as a design-to-cost program to acquire maximum reconnaissance capability for a firm unit flyaway price (UFP) of \$10M (FY94\$) per vehicle (including payload). Global Hawk was selected at the end of a competition involving multiple contractor teams. Streamlined procurement, using DARPA's Other Transaction Authority, is being used to delete all non value-added tasks and documentation from the program. Under the Developmental Phase agreement, the contractor is responsible for building and testing two Global Hawk air vehicles. As part of this agreement, the contractor will also build a developmental ground segment. During the Demonstration Phase, program management responsibility will transition to the Air Force. Funding for the post ACTD program begins in FY2000 for RDT&E and in FY2001 for production HAE UAVs.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

### B. Program Change Summary

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	Total Cost
Previous President's Budget	63.0	81.2	89.5	76.2	continuing
Appropriated Value	63.0	71.2			
Adjustments to Appropriated Value					
a. Undistributed Reduction	(4.3)	(1.7)			
b. Realignments	(2.7)	3.1			
President's Budget Request	56.0	72.6	96.0	64.6	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

### Change Summary Explanation:

Funding: Changes are due to Program Budget Decisions and programmatic decisions.

Schedule: N/A

Technical: N/A

### C. Other Program Funding Summary Cost

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	To Complete	Total Cost
<u>RDT&amp;E, DW</u> <u>(PE 0305205D)</u>										
HAE UAV	49.653	55.981	51.086	60.920	3.818	3.582	5.102	5.465	cont	cont
Common										
DarkStar	68.297	54.997	54.644	37.888	4.545	3.582	3.582	3.585	cont	cont
<u>Procurement, DW</u>										
HAE UAV						41.631	40.297	45.103	cont	cont

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	

#### D. Schedule Profile

Fiscal Year actual and planned events by quarter

FY1996*				FY1997*				FY1998				FY1999			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

#### Engineering Milestones

Preliminary System Specification Review - 2QFY95  
Initial Design Review - 4QFY95  
Final Design Review

X ——— X

#### Test & Evaluation Milestones

Flight Readiness Review  
Start Developmental Flight Tests

X X

#### Contract Milestones

System Development Agreement Award - 3QFY95  
Demonstration Agreement Award

X

#### Other Program Events

Fabricate Demonstration Air Vehicles (#3 - #8)  
User Field Demonstrations with Warfighters

X ——— X ——— X ———

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 030520SD/P804
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	

### Conventional High Altitude Endurance (CONV HAE) UAV - Global Hawk

#### A. Project Cost Breakdown

	(\$ in millions)		
	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>
1. Design Studies (previously referred to as Phase I)	0.000	0.000	0.000
2. Development & Test (previously referred to as Phase II)	54.159	56.849	10.000
3. Fabrication (previously referred to as Phase III)	0.000	12.000	44.000
4. Contractor Participation in Testing & Demonstrations	0.000	0.000	18.492
5. Fabrication, Demonstration and Evaluation Support	0.000	0.000	18.000
6. System Integration Laboratory	0.000	0.000	5.500
7. DARP Integration and Support	1.787	3.710	**
<b>TOTALS</b>	55.946	72.559	95.992
			64.621

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

\*\* FY 1998 and out-year funds for DARP I&S are justified under PE 0305209D.

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Exhibit R-3. RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D/P804
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	

**B. Budget Acquisition History and Planning Information**

Performing Organizations											
Contractor/ Government Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Product Development Organizations											
Teledyne Ryan Aeronautical Development Phase Agreement	C/CPFF	Nov 94			22.980	54.159	68.849	15.500		continuing	continuing
Teledyne Ryan Aeronautical Demonstration Phase Agreement	C/CPFF	TBD						62.000	42.000	continuing	continuing
Miscellaneous						1.787	3.710			continuing	continuing
Support and Management Organizations											
None											
Test and Evaluation Organizations											
Teledyne Ryan Aeronautical Demonstration Phase Agreement	C/CPFF	TBD						18.492	22.621	continuing	continuing
Government Furnished Property											
None											
Subtotal Product Development											
Subtotal Support and Management											
Subtotal Test and Evaluation											
TOTAL											

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305205D
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	239.712	189.346	216.712	167.864	31.734	19.106	20.866	20.544	continuing	continuing
Total Project Cost/No. and Subtotal Cost DarkStar (LO-HAE)/P805	68.297	54.997	54.644	37.888	4.545	3.582	3.582	3.585	continuing	continuing
Quantity of RDT&E Articles	2	2								

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** The High Altitude Endurance (HAE) UAV Advanced Concept Technology Demonstration (ACTD) program consists of two types of air vehicles, the Conventional HAE (CONV HAE) - Global Hawk and a Low Observable HAE (LO HAE) - DarkStar, and a Common Ground Segment (CGS), common and interoperable with both types of air vehicles. The Global Hawk and the HAE UAV Common programs are documented separately. The objective of the program is to place the assets in the hands of the warfighter as quickly as possible to assess the utility of the system in the context of military exercises with other Service/Theaters systems. The execution of the DarkStar program is dependent on funding of the HAE UAV Common program which contains the ground segment RDT&E and developmental and demonstration support funding for both DarkStar and Global Hawk A/Vs. The DarkStar will provide continuous, all-weather, day/night, wide area reconnaissance and surveillance in direct support of the Joint Forces Commander. The system consists of aircraft, sensors, communications and interfaces to theater systems to support tactical warfighters at various levels of command. The DarkStar will integrate with the existing tactical airborne reconnaissance architectures for mission planning, data processing, exploitation, and dissemination. The DarkStar will provide wide area search, over 15,000 sq nm per mission, with either the Electro Optical (EO) or Synthetic Aperture Radar (SAR) sensors at 1m resolution. In addition, the DarkStar is capable of 600 spot images per mission with either sensor at 0.3m resolution. The search and spot modes can be interleaved with attendant reductions in the overall coverage. The system will support a targeting accuracy of at least 20m CEP. The stealth capabilities of the DarkStar allow the system to operate in high threat environments before suppression of enemy air defenses (SEAD) where manned reconnaissance and the Global Hawk are not viable options. The optimization of this UAV for

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 030520SD
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

survivability means the UAV is less capable than the Global Hawk in terms of total endurance and payload capability. This project is categorized as Budget Activity 7 because it provides for technologies and capabilities in support of operational system development.

**Program Accomplishments and Plans: (\$ in millions)**

**FY1996 Accomplishments: (\$68.297)**

- Continued system integration and initiated DarkStar flight test (\$15.956)
- Completed integration and provided interim ground station support to air vehicle flight test with the LCRS and PDS (\$0.808)
- Fabricated, integrated and tested EO and SAR payloads (\$3.500)
- Completed static observables testing (\$1.270)
- Defined problems identified after crash of DarkStar A/V #1 and started corrective redesign of flight controls and landing gear subsystems (\$26.139)
- Fabricated DarkStar A/V #3 and initiated long lead funding for A/V #4 (\$18.750)
- Continued DARP Integration and Support (\$1.874)

**FY1997 Plans: (\$54.997)**

- Complete corrective redesign of flight controls and landing gear sub-systems identified after crash of DarkStar A/V #1 in FY 96 (\$22.000)
- Complete rebuild and initiate flight testing of DarkStar A/V #2 (\$11.151)
- Integrate EO framing technology (\$3.500)
- Initiate development of DarkStar A/V #4 (\$6.550)
- Initiate long lead funding for DarkStar A/Vs #5 and #6 (\$6.000)
- Provide fabrication, demonstration and evaluation support (\$5.000)
- Continue DARP Integration and Support (\$0.796)

**Obligation time frame for all FY97 funding will be from Oct 96 - Dec 97**

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Defense Airborne Reconnaissance Program (DARP) PE 0305205D	

**FY1998 Plans: (\$54.644)**

- Complete fabrication of DarkStar A/V #4 and commence fabrication of A/V #5 and #6 (\$21.500)
- Complete dynamic observables testing (\$9.600)
- Provide contractor participation in test and evaluation of military utility (\$13.000)
- Provide fabrication, demonstration and evaluation support (\$10.544)

**Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98**

**FY1999 Plans: (\$37.888)**

- Continue fabrication of DarkStar A/Vs #5 and #6 (\$9.200)
- Provide contractor participation in test and evaluation of military utility in joint exercises (\$26.688)
- Provide fabrication, demonstration and evaluation support (\$2.000)

**Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99**

**Acquisition Strategy:** The LO HAE system will be procured as a design-to-cost program to acquire the most reconnaissance capability for a firm unit flyaway price of \$10 million (FY94\$) per air vehicle (including payload). DarkStar was a sole-source award that leveraged substantial previous government investment in low-observable technology. Streamlined procurement using DARPA's Other Transaction Authority is being used to delete all non value-added tasks and documentation from the program. During the Demonstration Phase (previously referred to as Phase III), program management responsibility will transition to the Air Force. Funding for the post ACTD program begins in FY2000 for RDT&E and in FY2001 for production HAE UAVs.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY		February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305205D

**B. Program Change Summary**

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	<u>Total Cost</u>
Previous President's Budget Appropriated Value	48.0	17.4	5.8	9.5	continuing
Adjustments to Appropriated Value	66.0	45.9			
a. Undistributed Reduction	(4.2)	(1.1)			
b. Realignments	3.5	10.2			
c. Reprogramming	3.0				
President's Budget Request	68.3	55.0	54.6	37.9	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

**Change Summary Explanation:**

Funding: Changes are due to Program Budget Decisions and programmatic decisions.

Schedule: N/A

Technical: N/A

**C. Other Program Funding Summary Cost**

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	To Complete	Total Cost
<b><u>RDT&amp;E, DW</u></b> (PE0305205D)										
Global Hawk	55.946	72.559	95.992	64.621	19.072	7.739	7.876	7.079	cont	cont
HAE UAV Common	49.653	55.981	51.086	60.920	3.818	3.582	5.102	5.465	cont	cont

**RDT&E, DW**

(PE 0603226E)

25.000 14.700

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305205D	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

#### D. Schedule Profile

Fiscal Year actual and planned events by quarter

FY1996*				FY1997*				FY1998				FY1999			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

#### Engineering Milestones

Preliminary System Specification Review - 3QFY94  
Final Design Review - 1QFY95

#### Test & Evaluation Milestones

Flight Readiness Review - 4QFY95  
Start Developmental Flight Tests  
Resume Developmental Flight Tests

X

X

#### Contract Milestones

System Development Agreement Award - 3QFY94  
Demonstration Agreement Award

X

#### Other Program Events

Fabricate Developmental Air Vehicles (#3 and #4)  
Fabricate Demonstration Air Vehicles (#5 and #6)  
User Field Demonstrations with Warfighters

X ————— X  
X ————— X  
X ————— X

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN			DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D/P805	

Low Observable High Altitude Endurance (LO HAE) UAV - DarkStarA. Project Cost Breakdown

	(\$ in millions)			
	FY1996*	FY1997*	FY1998	FY1999
1. Development and Test (previously referred to as Phase IIA)	42.095	27.174	0.000	0.000
2. DarkStar Developmental Ground Segment Support	0.808	0.926	0.000	0.000
3. Ground Testing and A/V Support (previously referred to as Phase IIB)	4.770	8.551	9.600	0.000
4. Contractor Participation in Testing and Demonstrations	0.000	0.000	13.000	26.688
5. Developmental A/V (#2, #3 and #4) Fabrication (previously referred to as Phase IIC)	18.750	6.550	0.000	0.000
6. Fabrication of Developmental A/V (#4) and Demonstration A/Vs (#5 and #6) (previously referred to as Phase III)	0.000	6.000	21.500	9.200
7. Fabrication, Demonstration and Evaluation	0.000	5.000	10.544	2.000
8. DARP Integration and Support	1.874	0.796	**	**
<b>TOTALS</b>	68.297	54.997	54.644	37.888

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

\*\* FY 1998 and out-year funds for DARP I&amp;S are justified under PE 0305209D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D/P805
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

#### B. Budget Acquisition History and Planning Information.

<u>Performing Organizations</u>												
<u>Contractor/</u> <u>Government</u> <u>Performing</u> <u>Activity</u>	<u>Contract</u> <u>Method/Type</u> <u>or Funding</u> <u>Vehicle</u>	<u>Award or</u> <u>Obligation</u> <u>Date</u>	<u>Performing</u> <u>Activity</u> <u>EAC</u>	<u>Project</u> <u>Office</u> <u>EAC</u>	<u>Total</u> <u>Prior to</u> <u>FY1996*</u>	<u>Budget</u> <u>FY1996*</u>	<u>Budget</u> <u>FY1997*</u>	<u>Budget</u> <u>FY1998</u>	<u>Budget</u> <u>FY1999</u>	<u>Budget to</u> <u>Complete</u>	<u>Total</u> <u>Program</u>	
Product Development Organizations												
Lockheed Martin Skunk Works Development Phase Agreement for A/Vs #1 - #4	SS/CP/F	Jun 94			46.333	65.615	48.201	20.144		continuing	continuing	
Lockheed Martin Skunk Works Demonstration Phase Agreement for A/Vs #5 - #6	SS/CP/F	TBD					6.000	21.500	11.200	continuing	continuing	
Miscellaneous						2.682	.796			continuing	continuing	
Support and Management Organizations												
None												
Test and Evaluation Organizations												
Lockheed Martin Skunk Works Demonstration Phase Agreement	SS/CP/F	TBD						13.000	26.688	continuing	continuing	
<u>Government Furnished Property</u>												
None												
Subtotal Product Development												
Subtotal Support and Management												
Subtotal Test and Evaluation												
TOTAL												

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	239.712	189.346	216.172	167.864	31.734	19.106	20.866	20.544	continuing	continuing
Total Project Cost/No.										
Subtotal Cost	65.816	5.809	14.990	4.435	4.299	4.203	4.306	4.415	continuing	continuing
Predator (MAE)/P806										
Quantity of RDT&E Articles	3									

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** The Medium Altitude Endurance (MAE) Unmanned Aerial Vehicle (UAV) - Predator was an Advanced Concept Technology Demonstration (ACTD) project for the development of an endurance UAV capable of sustained (long dwell) surveillance of critical targets, under most weather conditions at ranges in excess of 500 nm from the launch area. The Predator is equipped with Electro-Optical/Infra-Red (EO/IR) and Synthetic Aperture Radar (SAR) sensors. The system also incorporates line-of-sight (LOS), narrow-band UHF SATCOM and wide-band Ku-Band SATCOM datalinks capable of providing near-real-time (NRT) transmission of high resolution imagery throughout the operational envelope. The system supports the theater commander and interfaces with the Command, Control, Communication, Computer, and Intelligence (C4I) architecture. The Predator is integral to the search and destruction of Critical Mobile Targets (CMT). The success of the Predator in a number of exercises and two operational deployments in Bosnia has prompted the Joint Requirements Oversight Council (JROC) to request an additional quantity of systems and sensors. The JROC has identified a number of P31 upgrades (De-icing, UHF/VHF Voice Relay, and IFF Mode IV) to be included with production systems. IR Sensor Improvements, UAV Common Automatic Recovery System and growth payloads, and a Heavy Fuel Engine (HFE) are being considered for P31 upgrades.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**Program Accomplishments and Plans: (\$ in millions)**

**FY1996 Accomplishments: (\$65.816)**

- Completed integration and testing of WB (Ku) SATCOM datalink and SAR (\$2.591)
- Acquired seven A/V's, two CGSs, two TS II communications vans, spares, and training elements to meet user, attrition and R&D requirements (\$31.316)
- Initiated development and integration of SIGINT payload, A/V de-icing, Ku-band video upgrade, and general system optimization (\$4.721)
- Continued deployment and field exercises with EO/IR and SAR sensors, UHF and Ku-band SATCOM, and C-band LOS communications capability; including deployment of one system to Bosnia in support of peace implementation force (IFOR) operations. ACTD completed and transitioned to operational use (1.886)
- Demonstrated support to Navy forces afloat (COMPTUEX and SSN demonstration) (\$1.200)
- Acquired an additional Predator ACTD system, spare, EO/IR sensors, and three SAR payloads (\$23.942)
- Continued Defense Airborne Reconnaissance Program (DARP) integration and support (\$.160)

**FY 1997 Plans: (\$5.809)**

- Initiated development and integration of UHF/VHF voice, Mode IV IFF, payload, Ku-band video, and general system optimization (\$4.058)
- Initiated IOT&E (\$1.472)
- Continued Defense Airborne Reconnaissance Program (DARP) Integration and Support (\$.279)

**Obligation time frame for all FY97 funding will be from Oct 96 - Dec 97**

**FY1998 Plans: (\$14.990)**

- Complete development and integration of UHF/VHF voice and IFF Mode IV IFF (\$1.370)
- Continue IOT&E (\$1.590)
- Define and integrate Trojan Spirit replacement (\$.650)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	

- Begin P3I development and integration for improved system location accuracy, GCS communication, and Acoustic Noise Reduction (\$4.403)
- Initiate Development, Integration, and Testing of Heavy Fuel Engine (HFE) (\$6.977)

**Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98**

**FY1999 Plans: (\$ 4.435)**

- Continue HFE development and integration (\$3.100)
- Continue integration, demonstration and test of growth payloads as prioritized by JROC (\$1.335)

**Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99**

**Acquisition Strategy:** The ACTD strategy was to integrate presently available military and commercial technologies to field a Predator system (3 air vehicles with EO/IR/SAR, Trojan Spirit II, related support equipment and integrated logistics for the demonstration period) for purposes of operational demonstration and assessment within 30 months of the go-ahead decision and provide a residual leave behind capability if required. A total of 12 air vehicles (2 air vehicles to replace losses in Bosnia) configured with EO/IR and optional SAR sensors, and line-of-sight and SATCOM datalinks along with 3 ground stations, 3 Trojan Spirit II, related support equipment and spares were procured during the ACTD period. JROC validation of a USACOM assessment of military utility and JROC requirement to expedite further production and fielding of Predator systems combined with Congressional plus-ups led to RFPs for the procurement of additional air vehicles, ground control stations, related support equipment and spares. The Acquisition Strategy is to procure "back-fill" components for ACTD residual systems to bring them to the operationally deployable configuration and enter the formal acquisition cycle with a Production Rate Verification in FY 97, IOT&E in FY97 with Full Rate Production starting in FY98. The Predator system configuration defined at the end of the ACTD is 4 air vehicles (3 air vehicles with EO/IR/SAR and 1 with EO/IR only), 1 ground control station, 1 Trojan Spirit II, related support equipment and integrated logistics support. The current budget provides for 13 of the 16 Predator systems established by the JROC with their specified minimum P3I (JROC Memorandum 173-96). The contracting strategy is to continue sole source with the ACTD contractors and include an

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	

operational integrated logistics support structure which will be fully operational by the end of FY98. Engineering and integration of additional P3I stated JROC Memorandum 173-96 will be pursued during the FYDP.

**B. Program Change Summary**

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	<u>Total Cost</u>
Previous President's Budget	20.0	6.1	15.9	4.8	continuing
Appropriated Value	45.3	6.1			
Adjustments to Appropriated Value					
a. Undistributed Reduction	(2.7)	(.2)			
b. Realignments	.8	(.1)			
c. Reprogramming	22.5				
President's Budget Request	65.9	5.8	15.0	4.4	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

**Change Summary Explanation:**

Funding: Reprogrammed Hunter UAV Procurement funds (\$22.5M) will purchase one additional Predator system, 3 additional SARs, and additional SATCOM data terminals.

Schedule: N/A

Technical: N/A

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	

C. Other Program Funding Summary Cost

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	To <u>Complete</u>	Total <u>Cost</u>
Procurement, OPN (UAV CARS)	N/A	7.833							continuing	continuing
Aircraft, PROC, AF (PE 35205F)	N/A	104.653	116.506	79.332	45.058	6.523	6.701	6.899	continuing	continuing
Other, PROC, AF (PE 27587F)		2.858							continuing	continuing
MILCON, AF (PE 27587F)				15.784					continuing	continuing
MILPERS, AF (PE 27587F)		20.182		22.305	25.163	27.888	28.649	29.448	continuing	continuing
O&M, AF (PE 27587F)		20.791		22.684	25.118	27.048	26.094	27.940	continuing	continuing

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**D. Schedule Profile**

Fiscal Year actual and planned events by quarter

	<u>FY1996*</u>				<u>FY1997*</u>				<u>FY1998</u>				<u>FY1999</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Acquisition Milestones</b>																
OSD Program Review						X										
OSD Program Initiation						X										
SAE Program Production Decision							X									
Production Rate Verification Start							X									
Full Rate Production (FRP) Start										X						
<b>Test &amp; Evaluation Milestones</b>																
1st Operational Assessment Report	X															
2nd Operational Assessment Report			X													
TEMP Development/Approval						X				X		X				
IOT&E																
Production Readiness Review						X						X				
<b>Contract Milestones</b>																
Production Rate Verification Contract Award						X										
FRP Contract Award											X					
FRP Option Exercise															X	

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D/P806	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

Medium Altitude Endurance (MAE) UAV - Predator

A. Project Cost Breakdown

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>
1. Hardware/Software	58.714	2.709	6.487	2.000
2. Demonstrations and Test	5.500	1.340	3.830	1.100
3. System Integration and Logistics Support	0.000	1.169	4.120	1.165
4. Other	1.602	.591	.553	.170
<b>TOTALS</b>	65.816	5.809	14.990	4.435

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D/P806
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**B. Budget Acquisition History and Planning Information**  
Performing Organizations

<u>Contractor/ Government Performing Activity</u>	<u>Contract Method/Type or Funding Vehicle</u>	<u>Award or Obligation Date</u>	<u>Performing Activity EAC</u>	<u>Project Office EAC</u>	<u>Total Prior to FY1996*</u>	<u>Budget FY1996*</u>	<u>Budget FY1997*</u>	<u>Budget FY1998</u>	<u>Budget FY1999</u>	<u>Budget to Complete</u>	<u>Total Program</u>
<b>Product Development Organizations</b>											
General Atomics	SS/CPFF SS/CPFF	Mar 97 Jan 97	NAVAIR		25.200	27.441 13.560	1.552	11.237	3.267	continuing	continuing 13.560
Lockheed Martin	SS/CPFF SS/FPF	Mar 97 Jan 97	NAVAIR		6.200	8.493 3.540	1.816	1.170	.500	continuing	continuing 3.540
AMERIND			NAVAIR		3.500	1.525					5.025
Northrop Grumman	SS/CPFF	Feb 96 Jan 97	CECOM		14.200	5.400 2.391					19.600 2.391
Misc		Dec 97			13.462	3.466	.279	.393	.168	continuing	continuing
<b>Subtotal</b>								12.800	3.935	continuing	continuing
<b>Product Development Organizations</b>					62.562	65.816	3.647	12.800	3.935	continuing	continuing
<b>Support &amp; Management Organizations</b>											
<b>Test &amp; Evaluation Organizations</b>							.822	.600			1.422
<b>Government Furnished Property</b>							1.340	1.590	.500	continuing	continuing
<b>N/A</b>											

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN				DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D/P806		
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7				

Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Subtotal Product Development				62.562	65.816	3.647	12.800	3.955	continuing	continuing
Subtotal Support & Management						.822	.600		continuing	1.422
Subtotal Test & Evaluation						1.340	1.590	.500	continuing	continuing
Subtotal Government Furnished Property										
TOTAL PROJECT				62.562	65.816	5.809	14.990	4.435	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	239.712	189.346	216.712	167.864	31.734	19.106	20.866	20.544	continuing	continuing
Total Project Cost/No.	49.653	55.981	51.086	60.920	3.818	3.582	5.102	5.465	continuing	continuing
Subtotal Cost HAE Common Ground Segment/P807										
Quantity of RDT&E Articles	1	1	1							

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** The High Altitude Endurance (HAE) UAV Advanced Concept Technology Demonstration (ACTD) program consists of two types of air vehicles, the Conventional (CONV) HAE UAV - Global Hawk and a Low Observable (LO) HAE UAV - DarkStar, and a Common Ground Segment (CGS) interoperable with both types of air vehicles. The HAE UAV Common program provides a Common Ground Segment consisting of a Launch and Recovery Element (LRE), a Mission Control Element (MCE), and associated logistics support activities. The HAE UAV Ground Segment integrates many technologies for communications between the Global Hawk, DarkStar, and exploitation centers/users. Without the HAE UAV Common program, the Global Hawk and DarkStar programs cannot be executed. The LRE prepares, launches, and recovers the air vehicles. The MCE plans and executes the mission; dynamically re-tasks the air vehicles, including the sensors; and processes, stores and/or disseminates the data as required. The CGS supports tactical warfighters at various levels of command with digital, near real-time, high quality, releasable imagery in exploitation form. The HAE UAV Common also funds government support and studies, GFE, and field demonstration support for both the Global Hawk and DarkStar systems. This Project is categorized as Budget Activity 7 because it provides funds for technologies and capabilities in support of operational system development.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**Program Accomplishments and Plans: (\$ in millions)**

**FY1996 Accomplishments : (\$49.653)**

- Completed initial design and initiated development and integration of developmental CGS (#1) (including integration with Global Hawk A/V) (\$28.643)
- Initiated design of CGS DarkStar capability (\$5.200)
- Performed CGS, Global Hawk, and DarkStar government support, studies, and related tasks (\$14.277)
- Continued DARP Integration and Support (\$1.533)

**FY1997 Plans: (\$55.981)**

- Complete development, integration and testing of developmental CGS and initiate performance testing with Global Hawk A/V (\$10.000)
- Complete design and initiate development of CGS DarkStar capability (\$14.000)
- Initiate development of first demonstration CGS (#2) (\$4.000)
- Provide government flight test and evaluation support (\$10.433)
- Perform CGS, Global Hawk, and DarkStar government support, studies, and related tasks (\$14.276)
- Continue DARP Integration and Support (\$3.272)

**Obligation time frame for all FY97 funding will be from Oct 96 - Dec 97**

**FY1998 Plans: (\$51.086)**

- Continue Global Hawk and DarkStar system performance testing (\$1.500)
- Complete development, integration and testing of developmental CGS (#1) and performance testing with DarkStar A/V (\$5.000)
- Complete development and test of demonstration CGS (#2) (\$22.000)
- Initiate development of demonstration CGS (#3) (\$1.800)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

- Provide government flight test and evaluation support (\$8.000)
- Conduct limited demonstrations and evaluate military utility with potential service users (\$2.000)
- Perform CGS, Global Hawk, and DarkStar government support, studies, and related tasks (\$10.786)

**Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98**

**FY1999 Plans: (\$60.920)**

- Complete development and test of demonstration CGS (#3) (\$23.800)
- Conduct demonstrations and evaluate military utility with potential service users (\$26.976)
- Perform CGS, Global Hawk, and DarkStar government support, studies, and related tasks (\$10.144)

**Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99**

**Acquisition Strategy:** The HAE UAV Common program provides the ground segment and support items common to the Global Hawk and DarkStar demonstrations. During the development phase, the ground segment originally designed for Global Hawk will be modified to include the capability to; 1) launch and recover; 2) command and control; and 3) receive, process, and disseminate DarkStar sensor data. Addition of this capability defines the Common Ground Segment (CGS) configuration. One (1) developmental and two (2) demonstration CGSs are planned to be fabricated during the ACTD. Streamlined procurement, using DARPA's Other Transaction Authority, is being used to delete all non value-added tasks and documentation from the program. During the Demonstration Phase, program management responsibility will transition to the Air Force. Funding for the post ACTD program begins in FY 2000 for RDT&E and in FY 2001 for procurement of HAE UAVs.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	

**B. Program Change Summary**

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	<u>Total Cost</u>
Previous President's Budget					
Appropriated Value	54.0	71.6	91.3	100.1	continuing
Adjustments to Appropriated Value	54.0	71.6			
a. Undistributed Reduction	(3.8)	(1.7)			
b. Realignments	(0.5)	(13.9)			
President's Budget Request	49.7	56.0	51.1	60.9	continuing
* FY 1997 and prior funding is justified as part of Program Element 0305154D.					

**Change Summary Explanation:**

Funding: Changes are due to Program Budget Decisions and programmatic decisions.

Schedule: N/A

Technical: N/A

**C. Other Program Funding Summary Cost**

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	<u>To Complete</u>	<u>Total Cost</u>
<b><u>RDT&amp;E, DW</u></b>										
PE0305205D										
Global Hawk	55.946	72.559	95.992	64.621	19.072	7.739	7.876	7.079	cont	cont
DarkStar	68.297	54.997	54.644	37.888	4.545	3.582	3.582	3.585	cont	cont

**Procurement, DW**

HAE UAV

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

41.631 40.297 45.103 cont

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

Related Activities. The Global Hawk program cannot be executed without the complementary HAE UAV Common Ground Segment program. This program also supports the DarkStar program.

#### D. Schedule Profile

Fiscal Year actual and planned events by quarter.

	<u>FY1996</u>				<u>FY1997</u>				<u>FY1998</u>				<u>FY1999</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Engineering Milestones</b>																
Preliminary System Specification Review - 3QFY95																
Developmental Phase Initial Design Review - 4QFY95																
Developmental Phase Final Design Review								X								
Deliver Developmental Ground Segment (#1)								X								
<b>Test &amp; Evaluation Milestones</b>																
Flight Readiness Review																
Start Developmental Flight Test with Global Hawk																
Compatibility Test with DarkStar																X

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**D. Schedule Profile**

Fiscal Year actual and planned events by quarter.

FY1996				FY1997				FY1998				FY1999			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

**Contract Milestones**

System Development Award - 3QFY95  
Global Hawk Demonstration Agreement Award

X

**Other Program Events**

Fabricate Demonstration Common Ground  
Segments (#2 and #3)  
User Field Demonstrations with Warfighters

X

X

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 030520SD/P807	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

High Altitude Endurance (HAE) UAV Common Ground Segment (CGS)

A. Project Cost Breakdown

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>
1. Developmental CGS (#1) (previously referred to as Phase II)	28.643	10.000	1.500	0.000
2. Developmental CGS DarkStar Capability Efforts	5.200	14.000	5.000	0.000
3. Fabricate Demonstration CGSs (#2 and #3) (previously referred to as Phase III)	0.000	4.000	23.800	23.800
4. Government Demonstration and Testing Support	0.000	10.433	10.000	26.976
5. Studies and Program Office Support	14.278	14.276	10.786	10.144
6. DARP Integration and Support	1.532	3.272	**	**
<b>TOTALS</b>	49.653	55.981	51.086	60.920

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

\*\*FY 1998 and out-year funds for DARP I&S are justified under PE 0305209D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D/P807
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**B. Budget Acquisition History and Planning Information.**

Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
<b>Product Development Organizations</b>											
Teledyne Ryan Aeronautical Developmental Systems Agreement	C/CPFF/IF	Nov-94			5.400	28.542	10.000	1.500		continuing	continuing
E-Systems Developmental Ground Station	SS/CPAF	Jan-96				4.000	14.000	5.000		continuing	continuing
E-Systems Demonstration Ground Stations	TBD	TBD					4.000	23.800	23.800	continuing	continuing
Miscellaneous						1.533	3.272			continuing	continuing
<b>Support and Management Organizations</b>											

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN											DATE February 1997
APPROPRIATION/BUDGET ACTIVITY						R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D/P807					
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7											
Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Science Applications International Corporation	C/CPFF	Feb-96				5.575	5.000	5.000	4.000	continuing	continuing
Miscellaneous						8.703	7.336	5.786	6 144	continuing	continuing
Test and Evaluation Organizations											
Air Force Flight Test Center	Allot					.200	3.700	4.500	4.500	continuing	continuing
Miscellaneous							6.733	4.500	22.476	continuing	continuing
Government Furnished Property											
Product Development Organizations											
Miscellaneous						1.100	1.940	1.000		continuing	continuing
Subtotal Product Development											
					5.400	35.175	33.212	31.300	23.800	continuing	continuing
Subtotal Support & Management											
						14.278	12.336	10.786	10.144	continuing	continuing
Subtotal Test & Evaluation											
						.200	10.433	9.000	26.976	continuing	continuing
TOTAL											
					5.400	49.653	55.981	51.086	60.920	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-I ITEM NOMENCLATURE	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D	

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	206.304	118.212	212.961	169.217	196.008	180.257	170.773	183.226	continuing	continuing
Project Name/No. and Subtotal Cost Advanced Sensors/P808	139.849	64.008	131.156	98.441	125.169	91.358	89.200	90.527	continuing	continuing
Project Name/No. and Subtotal Cost Advanced Technology/P809	38.681	30.516	37.409	34.688	34.750	39.336	38.791	40.872	continuing	continuing
Project Name/No. and Subtotal Cost Common Data Link (CDL)/P810	27.774	23.688	44.396	36.088	36.089	49.563	42.782	51.827	continuing	continuing
SubProject Name/No. and Subtotal Cost DARO Operations/P525	**	**	**	**	**	**	**	**	**	**
Quantity of RDT&E Articles										

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

\*\* Funding for DARO Operations is justified as part of the DARP Integration and Support program element (0305209D).

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** This program funds and coordinates the development of advanced defense airborne reconnaissance technologies to ensure systems satisfy strategies and architectures to assure U.S. ability to support warfighter intelligence needs in the face of rapidly developing threat technology, proliferation of advanced weaponry, and uncertain political alignments. This program funds the development of the technologies that respond to evolving threats by stressing multi-service utility, interoperability among existing and planned complementary systems (i.e., sensors, ground systems, data links, and manned and unmanned platforms), and timely dissemination of intelligence information to operational forces. It also funds the architecture and master planning activities that will provide the overall guidance for airborne reconnaissance SIGINT and IMINT, and manned/unmanned airborne reconnaissance systems. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

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EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D	

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	206.304	118.212	212.961	169.217	196.008	180.257	170.773	183.226	continuing	continuing
Total Project Cost/No.	139.849	64.008	131.156	98.441	125.169	91.358	89.200	90.527	continuing	continuing
Subtotal Cost Advanced Sensors/P808										
Quantity of RDT&E Articles										

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** Provides funds for the development of sensor systems to improve present airborne reconnaissance capabilities. The developments are driven by evolving collection requirements and modern technology advances. The developments allow for the necessary changes required to meet an integrated, objective airborne reconnaissance architecture as defined in the Integrated Airborne Reconnaissance Strategy (IARS) and amplified in the Airborne Reconnaissance Information Technical Architecture (ARITA). Particular emphasis is placed on multi-platform interoperability. The Advanced Sensors Development Program implements successful proof-of-concept efforts accomplished in the Advanced Technology Program, other Service/Agency developments, and Congressionally-funded initiatives leading to producible sensor systems for airborne platforms. Upon successful sensor prototype demonstration, technology sensor developments are turned over to the Services for procurement and platform integration. The advanced sensor program includes technical analyses, systems engineering assessments, planning, and development for advanced airborne sensor systems. This effort focuses on developments which support sensor system interoperability and standardization of multi-Service and multi-platform applications. The advanced sensor developments will provide the technology transition modules for operational use necessary for the overall migration of the airborne fleet (manned and unmanned) to a Joint Airborne SIGINT Architecture (JASA) (i.e., sensors, ground systems, data links, and platforms), and provide the mechanism required for timely dissemination of intelligence information to operational forces. The development and modification of the lead integration aircraft (EP-3E) for the initial JASA modules will provide a mechanism to begin development and operational assessment of the Joint SIGINT Avionics Family (JSAF) components. Coordinated and complementary airborne sensor development across the military Services and the

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EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION		
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	DATE
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D	February 1997

Defense and Intelligence Agencies are being established for inclusion into the JASA. This sub-project also includes funding for U-2 sensor upgrades and multispectral imaging (MSI) developments. This program is categorized as Budget Activity 7 because it provides for the development of technologies and capabilities in support of Operational Systems Development.

**Programs Plans and Accomplishments: (\$ in millions)**

**FY1996 Accomplishments: (\$139.849)**

**JASA (\$80.002)**

- Continued development of JASA standards
- Complete independent cost analysis and supported SIGINT mix study
- Continue development of High Band Prototype (HBP)

**Advanced Developments (\$48.058)**

- Upgraded U-2 sensor systems to enhance sustainability
  - Initiated integration of geolocation receiver and multimode antenna array to form a geolocation system
  - Continued Story Series developments to adapt and integrate commercial products for monitoring, classifying, tracking, and transmission of threat emitters as well as SAR imagery and high resolution video integration
  - Completed utility assessment of ROSS
  - Continued H/SIP and SYERS MSI upgrades
  - Performed Predator imagery upgrades
  - Initiated ATARS second increment data link development
- Guardrail Common Sensor/JASA Technology Transfer (\$5.400)**
- Complete JASA-developed Low Band/Drop-On SIGINT Receiver and integrate with Guardrail aircraft
- Funds realigned to this PE by erroneous OSD adjustment (\$2.362)**
- DARP integration and support (\$4.027)**

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EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D	

**FY1997 Plans: (\$64.008)**

**JASA (\$54.200)**

- Continue refinement of JASA standards
- Perform HBP integration and initiate flight testing
- Initiate Low Band Sub System (LBSS) development

**Advanced Developments (\$6.898)**

- Execute Congressional plus-ups for upgrades to U-2 sensor system
- Complete H-Camera Phase II
- Continue H/SIP Beta camera and SYERS MSI upgrades
- Complete Congressionally directed ATARS data link development and demonstration
- Integrate Story Scanner onto aircraft
- Continue integration of geolocation receiver and multimode antenna array to form a geolocation system
- Continue Story Series developments

**DARP Integration and Support (\$3.031)**

**Obligation time frame for all FY97 funding will be from Oct 96 - Dec 97**

**FY1998 Plans: (\$ 131.156)**

**JASA (\$112.880)**

- Develop JSAF components (\$108.880)
  - Complete High Band Prototype (HBP) Flight Testing (\$12.500)
  - Complete lead platform JASA component integration (\$0.780)
  - Continue Low-Band Sub-Systems (LBSS) development (\$30.700)
  - Award and start High-Band Sub-Systems (HBSS) development (\$12.300)
  - Continue A-kit development for JSAF integration and testing (\$52.600)

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EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION		
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	DATE
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D	February 1997

- ARL (\$7.000)
- RIVET JOINT (\$13.200)
- EP-3 (\$11.100)
- AF Special (\$11.700)
- Global Hawk (\$9.600)
- Continue refinement of JASA standards (4.000)
  - Evolve standards to track industry and community trends, to increase the level of interoperability, and to accommodate new requirements (\$1.000)
  - Publish Updates of the JASA Standards Handbook semi-annually (Jan and Jun 98) (\$0.500)
  - Verify compliance of airborne developments (upgrades and new developments) with JASA standards (\$1.500)
  - Verify interoperability of new developments/upgrades (\$1.000)

#### Advanced Developments (\$18.276)

- Continue Story Series developments (\$5.750)
  - Complete Story Book fusion software development (\$2.000)
  - Initiate Story Book DF antenna EDM development (\$1.250)
  - Complete Story Book Programmable Interface Processor (PIP) (\$0.750)
  - Initiate Story Finder size reduction (\$1.750)
- Develop advanced technologies supporting JASA (Compass Bright) (\$1.627)
  - Demonstrate wide-band digital receiver optimization capability
  - Complete antenna optimization chamber testing
  - Develop embedded symmetric multi-processor (SMP)
- Begin HAE development for incorporation of JSAF prime mission equipment (\$6.571)
  - Develop and integrate Group A related equipment (Antenna, RFD's, Buss structures, etc.) for Global Hawk
- Other (\$2.328)
  - Develop design approach/modification changes required for inclusion of Voice Advanced Technology Demonstration (ATD) (\$0.610)

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EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION		
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	DATE
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D	February 1997

- Begin development of two U-2 nose kits and two sapphire windows (\$1.718)
- Initiate COMBAT SENT wideband system development (\$2.000)
  - Temporary installation of Wideband ELINT Channelized Receiver System (WECRS) (\$ 1.000)
  - Continue Frequency Hopping Receiver System (FARS) development (\$ 1.000)

Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98

FY 1999 Plans: (\$98.441)

JASA (\$78.378)

- Develop JSAF components (\$74.378)
  - Continue LBSS development, ground, and flight test (\$34.100)
  - Continue HBSS (\$11.378)
  - Continue A-kit development for JSAF integration and testing (\$28.900)
    - ARL (\$5.000)
    - RIVET JOINT (\$8.700)
    - EP-3 (\$4.400)
    - AF Special (\$6.500)
    - Global Hawk (\$4.300)
- Continue refinement of JASA standards (\$4.000)
  - Evolve standards to track industry and community trends, to increase level of interoperability, and to accommodate new requirements (\$1.000)
  - Publish updates of the JASA Handbook semi-annually (Jan and Jun 99) (\$0.500)
  - Verify compliance of airborne developments (upgrades and new developments) with JASA standards (\$1.500)
  - Verify interoperability of new developments/upgrades (\$1.000)

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EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
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#### Advanced Developments (\$20.063)

- Continue Story Series developments (\$2.725)
  - Complete Story Book DF antenna integration design (\$0.500)
  - Integrate, install, and ground and flight test Story Book DF antenna (\$0.500)
  - Initiate non-recurring engineering for amplitude collection systems to acquire frequencies up to 40 Ghz (\$1.725)
- Develop advanced technologies supporting JASA (\$2.000)
  - Evaluate prototype antenna breadboards in anechoic chamber (\$ 1.000)
  - Complete symmetric multi-processor (SMP) integration into RAS-1A for Air Force special platform (\$ 1.000)
- Continue HAE SIGINT development (\$9.511)
  - Develop and integrate Group A (Antenna, RFD's, Buss structures, etc.) for Global Hawk
- Other (\$3.327)
  - Integrate Voice Advanced Technology Demonstration (ATD) (\$0.180)
  - Install and test Voice ATD prototype on platform (\$0.150)
  - Complete two U-2 nose kits and two sapphire windows (\$2.997)
- Continue COMBAT SENT Wideband System development (\$2.500)
  - Integrate Wideband ELINT Channelized Receiver System with Common Aperture RF Distribution System (hardware/software)

**Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99**

**Acquisition Strategy:** The Advanced Sensors line funds virtually all airborne advanced sensor developments necessary to collect against an increasingly sophisticated and rapidly evolving collection threat. It consists of one large SIGINT program (JASA) and several smaller programs - SIGINT, IMINT, & MASINT. The DARO is placing increased emphasis in making the numerous SIGINT systems flying on Service platforms more interoperable and common. A Joint SIGINT Avionics family is being developed to achieve this goal. In the interim, collection capability must be sustained in existing manned reconnaissance aircraft until more enhanced, capable JASA systems become available. This line also funds IMINT and MASINT developments and upgrades such as the MSI H/SIP and SYERS upgrades and the imagery sensor development to be flown on the Predator UAV. Sustainability and QRC projects are developed within this funding line.

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EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
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### B. Program Change Summary

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	Total Cost
Previous President's Budget	126.9	66.4	135.8	94.2	continuing
Appropriated Value	141.9	66.4			
Adjustments to Appropriated Value					
a. Undistributed Reduction	(5.7)	(2.4)			
b. Realignments	1.3				
c. Other	2.4				
President's Budget Request	139.9	64.0	131.2	98.4	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

### Change Summary Explanation:

Funding: Funds realigned in FY 96 for continuing JASA standards work (\$1.3)  
Other funds realigned to this PE by OSD adjustment \$2.4

Schedule: N/A

Technical: N/A

### C. Other Program Funding Summary

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	To Complete	Total Cost
APAF DARP, Spares, U-2			10.000		5.000		26.000	25.000	cont	cont
APN DARP, EP-3 Mods						20.000	7.000	8.000	cont	cont
OPAF DARP MIRGS				12.000	15.000	4.000			0	31.000
OPN DARP, ARGSS						5.000	5.000		0	10.000

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**D. Schedule Profile**

Fiscal Year actual and planned events by quarter

	<u>FY1996 *</u>				<u>FY1997 *</u>				<u>FY1998</u>				<u>FY1999</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

**Engineering Milestones****JASA**

Standards Development

High Band Prototype (HBP)  
System Development

Lead Platform Integration

HBP Test Flight

Low-Band Sub-System (LBSS)  
DevelopmentHigh-Band Sub-System (HBSS)  
Development

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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# **D. Schedule Profile**

Fiscal Year actual and planned events by Quarter

	FY1996 *				FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Advanced Development</b>																
Remote Orbiting Sensor System Study and Prototyping	X	X	X													
<b>ATARS</b>																
Second Increment Data Link Develop Data Link Demonstration		X	X	X		X	X	X								
Story Book (SB) JASA																
Algorithm Testing (Windjammer)	X															
SB - DF antenna EDM development													X			
SB Antenna Installation and Testing														X	X	
SB Fusion Software																X
SB Programmable Interface Processor (PIP)																
SB PIP/Windjammer SIL Integration																
Testing																
SF Size Reduction Test and Evaluation																
SF Frequency Extension																

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION									
APPROPRIATION/BUDGET ACTIVITY								DATE February 1997	
R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D									
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7									

**D. Schedule Profile**

Fiscal Year actual and planned events by quarter

	FY1996 *				FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Voice ATD Development																
U-2 Sensors Upgrade Modification																
H/SIP and SYERS MSI Upgrade																
Developments																
Develop Embedded Symmetric Multi-Processor																
HAE SIGINT Development																
COMBAT SENT Wideband System Dev																

**T&E Milestones****Contract Milestones****JASA**

JASA Standards Handbook, v1.0 Published

JSH Updates Published

HBP Test Flight Begins

HBP Complete

LBSS RFP

LBSS Contract Award

LBSS Integration

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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#### D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1996 *				FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
LBSS PDR																
LBSS CDR																
HBSS RFP																
HBSS Contract Award																
HBSS SRR																
HBSS PDR																
HBSS CDR																
Story Finder Size Reduction PDR																
Story Finder Size Reduction CDR																
Story Finder SIL Integration & Testing																
Story Finder A/C Installation & Testing																
Story Finder Frequency Extension CDR																
Voice ATD PDR																
Voice ATD CDR																
Voice ATD SIL Integration & Testing																
Voice ATD A/C Installation & Testing																
ATARS Second Increment Data Link																
U-2 Sensors Upgrade Modification																
Contract Award																
H/SIP MSI System Flight Test Demo																

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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**D. Schedule Profile**

Fiscal Year actual and planned events by quarter

	<u>FY1996 *</u>				<u>FY1997 *</u>				<u>FY1998</u>				<u>FY1999</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
H/SIP Phase II Complete									X							
U-2 Sensor Upgrade Complete																
SYERS P31/U-2 MSI System first Delivery												X				
Embedded Symmetric Multi-Processor Contract Award										X						
HAE SIGINT Contract Award																

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
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Advanced Sensors Development Program

A. Project Cost Breakdown

<u>A. Project Cost Breakdown</u>	(\$ in millions)			
	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>
1. Primary Hardware & Software Development	93.061	43.127	98.910	76.268
2. Systems Engineering	25.473	8.111	17.516	12.634
3. Contractor Engineering Support	5.050	3.689	1.695	
4. Government Engineering Support	9.876	6.171	13.035	9.539
5. Miscellaneous and Integration and Support	4.027	2.910	**	**
6. Other	2.362	0.000	0.000	0.000
<b>TOTALS</b>	139.849	64.008	131.156	98.441

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

\*\* FY 1998 and out-year funds for DARP I&S are justified under PE 0305209D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
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RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**B. Budget Acquisition History and Planning Information****Performing Organizations**

Contract/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Product Development Organizations											
SAF/AQ	SA	Feb 97			568,705	92,926	48,097	114,225	81,875	continuing	continuing
SARD-SA	MIPR	Feb 97			14,072	5,961	3,525			continuing	continuing
N880C6	SA	Feb 97			42,832	24,000	5,240	5,750	2,725	continuing	continuing
Other	MIPR	Various			17,864		3,335	11,181	13,841	continuing	continuing

**Support & Management Organizations**

Support & Management Integration and Support					15,100	10,573 4,027	0,901 2,910	**	**	continuing continuing	continuing continuing
Other					5,000	2,362			2,362		2,362

**Test & Evaluation Organizations****Government Furnished Property N/A**

Product Development Subtotal					643,473	122,887	60,197	131,156	98,441	continuing	continuing
Other Subtotal					5,000	2,362			2,362		2,362
Support & Management Subtotal					15,100	14,600	3,811			continuing	continuing
Test & Evaluation Subtotal											
Government Furnished Property Subtotal											
PROJECT TOTAL					663,573	139,849	64,008	131,156	98,441	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

\*\*FY 1998 and out-year funds for DARP I&amp;S are justified under PE 0305209D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
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COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	206.304	118.212	212.961	169.217	196.008	180.257	170.773	183.226	continuing	continuing
Total Project Cost/No. Subtotal Cost										
Advanced Technology/P809	38.681	30.516	37.409	34.688	34.750	39.336	38.791	40.872	continuing	continuing
Quantity of RDT&E Articles										

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** There are two primary objectives for the Advanced Technology funding: (1) to evaluate the utility and maturity of technology for airborne reconnaissance applications; and (2) to reduce the risk of employing emerging technologies in system upgrades, new system acquisitions, or Advanced Concept Technology Demonstrations (ACTDs), by integrating and exercising them in developmental and operational tests. These technologies help satisfy the requirements of the objective architecture set forth in the Integrated Airborne Reconnaissance Strategy (IARS). These technology investments are also identified in the Airborne Reconnaissance Technology Program Plan (ARTPP), published in November 1994. They were carefully selected from a broad range of technologies to provide utility to the warfighter at acceptable levels of cost and risk. This project continues technology transition programs in eight critical areas identified in the ARTPP. These include: (1) low-cost reconnaissance pods; (2) exigent target detection; (3) precision geolocation; (4) signals intelligence (SIGINT); (5) imagery screening and analyst cueing; (6) automatic target recognition (ATR) and correlation; (7) high-data-rate uplinks and crosslinks; and (8) advanced common data link technology. This is not a prioritized listing. A new category, (9) technology initiatives, includes technology transition programs specifically designated by Congress. The DARO migration plan identifies where key investments will be made in the eight critical areas to assure that new technologies provide an integrated airborne reconnaissance capability for the warfighter in an evolving threat environment. Those that fall in the ninth category will be reviewed for compatibility with our technical architecture plan. This program leverages the commercial base at every opportunity while investing in carefully selected DoD-unique areas. Additionally, it

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defines near-term demonstrations in specific areas, followed by ones in which the most promising technology is chosen from a pool of possibilities currently under investigation within government and commercial sectors. As in the development of the ARTPP, this definition phase is accomplished with community-wide participation. Representatives from the Services, the JCS, and Defense Agencies continue to provide input during project solicitation. Regular working group meetings provide user/developer interface. The Director, DARO provides final project selection approval. This program is categorized as Budget Activity 7 because it provides for the development of technologies and capabilities in support of Operational System Development.

**Program Accomplishments and Plans: (\$ in millions)**

**FY1996 Accomplishments: (\$38.681)**

- Technology transition programs identified in the Airborne Reconnaissance Technology Program Plan (\$22.550)
  - Low-cost Reconnaissance Pod
    - Examined solid-state digital recorder application to tactical reconnaissance
  - Exigent Target Detection
    - initiated modifications to air traffic control subsystem to enable operational HSI sensor demonstrations
  - Precision Geolocation
    - SIGINT - performed aircraft modifications for multi-platform precision emitter geolocation
    - IMINT - completed feasibility study of precision target geolocation technologies and selected two technology demonstrations
  - Imagery Screening & Analyst Cueing - continued integration of automatic target recognition developments in Semi-Automated IMINT Processing (SAIP) workstation
    - ATR & Correlation
      - Continued development of single scale algorithms for target nomination in SAR imagery
      - Continued development of moving target exploitation algorithms
  - High-Data-Rate Links - completed High-Data-Rate Comms Study

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- Technology Initiatives (\$15,000)
  - Multi-function Self-aligned Gate (MSAG) - initiated development of tile element for active aperture antenna
  - Framing Reconnaissance Cameras
    - Completed the 4 megapixel camera testing and deployed on F-16's to Bosnia
    - Developed 25 megapixel camera
    - Awarded 100 megapixel camera contract
  - DARP Integration and Support (\$1.132)
- FY1997 Plans: (30.516)**
- Technology transition programs identified in the ARTPP (\$16.516)
  - Exigent Target Detection
    - Hyperspectral sensor demonstration on ARL
    - Develop sensor compatible with the installation on the Predator UAV, as part of the Counter Camouflage Concealment & Deception (CC&D) ACTD
  - Precision Geolocation
    - SIGINT - continue development of cooperative geolocation techniques
    - IMINT - initiate development of passive radar tags and UAV GPS pseudolite
  - ATR & Correlation
    - Moving Target Exploitation (MTE) - demonstrate 1-D and 2-D ATR in testbed
    - MTE - demonstrate image/profile formation with ATR on JSTARS data
    - Intelligent Bandwidth Compression (IBC) - demonstrate single-scale IBC in real-time environment
    - IBC - demonstrate multi-scale IBC approach
  - Technology initiatives (\$14,000)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
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RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Airborne Reconnaissance Advanced Development PE 0305206D	

- MSAG - Complete the prototype active array antenna and begin integration on Predator UAV
- Framing Reconnaissance Cameras
  - Verify concept and develop IR Step-Stare camera
  - Design and develop IR compression boards for CA-261 camera
  - Apply multi-spectral filter and test modified CA-261/25 camera

**Obligation time frame for all FY97 funding will be from Oct 96 - Dec 97**

**FY1998 Plans: (\$37.409)**

- Technology transition programs identified in the ARTPP (\$37.409)
  - Exigent Target Detection (\$5.000)
    - Integrate Predator hyperspectral imager demonstration on manned surrogate in cooperation with DARPA
  - Precision Geolocation (\$8.000)
    - Initiate UAV pseudolite augmentation in cooperation with DARPA (\$3.000)
    - Perform cooperative SIGINT geolocation demonstrations (\$5.000)
    - SIGINT (\$2.000)
  - Initiate study on multi-use antenna for SAR/COMMS/SIGINT
  - ATR and Correlation (\$5.000)
    - Demonstrate Moving Target Exploitation functionality in virtual testbed (\$3.000)
    - Demonstrate Intelligent Bandwidth Compression real-time on U-2 and Global Hawk (\$2.000)
  - High-Data-Rate Crosslinks (\$6.081)
    - Build and test CDL-compatible EHF-band data link (\$3.500)
    - Complete laser terminal fabrication and perform air-to-air demonstration (\$2.581)
  - Framing Reconnaissance Cameras (\$7.000)
    - Complete development of 4-Megapixel IR framing camera and test (\$0.750)
    - Begin development of 25-Megapixel equivalent IR framing camera (\$5.050)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	DATE
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- 100 Megapixel Camera Buy (\$1.200)
- Heavy Fuel Engine (\$3.000)
- Initiate development of heavy-fuel engine for tactical UAV
- Technology Initiatives (\$1.328)

**Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98**

**FY 1999 Plans: (\$34.688)**

- Technology transition programs identified in the ARTPP (\$34.688)
  - Exigent Target Detection (\$4.000)
  - Integrate U-2 multispectral imager and conduct demonstration in cooperation with DARPA
  - Precision Geolocation - IMINT (\$2.600)
  - Perform Critical Design Review on brass board UAV Pseudolite augmentation in cooperation with DARPA
  - Precision Geolocation - SIGINT (\$5.000)
  - Perform cooperative SIGINT geolocation demonstrations
  - SIGINT (\$2.000)
  - Continue antenna technology improvements for SAR/COMMS/SIGINT
  - Automatic Target Recognition (\$4.300)
  - Demonstrate MTE system on JSTARS and Global Hawk (\$2.000)
  - Develop FOPEN SAR and multi-spectral exploitation algorithms (\$2.300)
  - High Data Rate Communications (\$6.455)
  - Test and demonstrate EHF air-to ground link (\$2.900)
  - Demonstrate air-to-air laser link and develop forward error correction (\$3.555)
  - Framing Reconnaissance Cameras (\$7.333)
  - Continue development of 25-Megapixel equivalent IR framing camera (\$3.000)
  - Begin multi-spectral medium altitude sensor development and transition MSI algorithms (\$4.333)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
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- Heavy Fuel Engine (\$3,000)
- Continue development of heavy fuel engine for Tactical UAV

**Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99**

**Acquisition Strategy:** A variety of acquisition strategies are being incorporated depending on the specific advanced technology in question and the organization developing the technology.

#### **B. Program Change Summary**

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	<u>Total Cost</u>
Previous President's Budget	24.9	17.5	44.6	38.0	continuing
Appropriated Value	39.9	31.5			
Adjustments to Appropriated Value					
a. Undistributed Reduction	(2.8)	(1.1)			
b. Realignments	1.6	.1			
President's Budget Request	38.7	30.5	37.4	34.7	continuing

\*FY 1997 and prior funding is justified as part of Program Element 0305154D.

#### **Change Summary Explanation:**

Funding: Funds realigned to support Bosnian deployment requirements for F-16 framing camera.

Schedule: N/A

Technical: N/A

#### **C. Other Program Funding Summary Cost**

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	To <u>Complete</u>	<u>Total Cost</u>
None										

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**D. Schedule Profile**

Fiscal Year actual and planned events by quarter

	FY1996 *				FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

**Acquisition Milestones**Low Cost Reconnaissance Pod

F-16 Reconnaissance Pod Evaluation

X

Exigent Target Detection

Hyperspectral Sensor Demo on ARL

X

First HSI System Demonstration on

X

Manned Surrogate Aircraft

Precision Geolocation

IFSAR Demonstration at Fort Hood

X

Cooperative SIGINT Geolocation

X

X

Demonstration

Perform Critical Design Review on Brass

Board UAV Pseudolite Augmentation in

Cooperation with DARPA

X

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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**D. Schedule Profile**

Fiscal Year actual and planned events by quarter

	FY1996 *				FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
High-Data-Rate Crosslinks																
Extremely High Frequency (EHF)																
Crosslink Development																
Test and Demonstrate EHF Air-to Ground Link																
Air-to-air Laser Communications Demonstrations																
Laser Crosslink Terminal Program SRR																
Laser Crosslink Terminal Program PDR																
Laser Crosslink Terminal Program CDR																
Laser Crosslink Test Aircraft and Terminal Delivery																
Laser Crosslink Test Complete																
ATR and Correlation																
Demonstrate Moving Target Exploitation Functionality in Virtual Testbed																
Conduct Real-Time Demo of MTE system																
Conduct Flight Demo of MTE on JSTARS																
Demonstrate Single-Scale Intelligent Bandwidth Compression (IBC) in Real-Time																

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
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RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

#### D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1996 *				FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Demonstrate Multi-Scale IBC Approach																
Demonstrate Single-Scale and Multi-Scale																
ATR Applications on U-2R																
Demonstrate Split-Based IBC Operations																
with SAIP Demo																
<u>Framing Reconnaissance Cameras</u>																
25 Megapixel Framing Camera Delivery																
Initiate 100 Megapixel FPA Tech Demo																
Test 4 Megapixel IR Framing Camera																
Begin Multi-Spectral Medium Altitude																
Sensor Development																
<u>Multifunction Self-Aligned Gate</u>																
Complete MSAG System Definition and																
Tile Development																
Install and Demonstrate MSAG Tile																
Quad/Array																

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D/P809	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

### Airborne Reconnaissance Advanced Technology

#### A. Project Cost Breakdown

	(\$ in millions)			
	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>
Product Development	37.549	30.516	37.409	34.688
Integration and Support	1.132	0.000	**	**
TOTALS	38.681	30.516	37.409	34.688

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

\*\* FY 1998 and out-year funds for DARP I&S are justified under PE 0305209D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D/P809
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**B. Budget Acquisition History and Planning Information**

Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
<b>Product Development Organizations</b>											
Litton ITEK. Bedford, MA					10.000					0.000	10.000
Other Non-Prime Contractors and Government Orgs					4.489	37.549	30.156	37.409	34.688	continuing	continuing
					14.489	37.549	30.516	37.409	34.688	continuing	continuing
<b>Subtotal</b>											
<b>Support and Management Organizations</b>											
Integration and Support						1.132		**	**	continuing	continuing
						1.132		**	**	continuing	continuing
<b>Subtotal</b>											
<b>Test and Evaluation Organizations</b>											
Government Furnished Equipment											
N/A											

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

\*\*FY 1998 and out-year funds for DARP I&S are justified under PE 0305209D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D/P809	

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Product Development Subtotal					14.489	37.549	30.516	37.409	34.688	continuing	continuing
Support & Management Subtotal						1.132				continuing	continuing
Test & Evaluation Subtotal											
Government Furnished Property Subtotal											
PROJECT TOTAL					14.489	38.681	30.516	37.409	34.688	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D	

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	206.304	118.212	212.961	169.217	196.008	180.257	170.773	183.226	continuing	continuing
Total Project Cost/No. Subtotal Cost										
Airborne Reconnaissance Common Data Link (CDL)/P810	27.774	23.688	44.396	36.088	36.089	49.563	42.782	51.827	continuing	continuing
Quantity of RDT&E Articles										

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** The objective of the CDL effort within the DARP is to define an interoperable command, control and communications capability for intelligence and reconnaissance assets to include both manned and unmanned platforms. CDL will achieve interoperable communications paths by employing an architecture based on developed hardware, software, and waveforms to promote commonality among the Services. The CDL program will maintain design configuration commonality resulting in lower life-cycle costs. The CDL design will permit existing and future reconnaissance assets to operate worldwide, providing sensor data directly to ground sites or via satellite or air-to-air relay when the asset and ground site are not within line-of-sight. This effort will integrate commercial satellite communications into the available satellite relay options to ensure sufficient wideband data relay capability. The system will have sufficient bandwidth to accommodate numerous sensors collecting SIGINT, IMINT and Multi-spectral data. Modular design allows for future technology insertion. The commonality of modular components reduces non-recurring engineering and life cycle costs to the DoD user. Interoperability provides for the exchange of data across service or agency boundaries. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of Operational System Development.

**Program Accomplishments and Plans:** The CDL program supports development of advanced communications capabilities which offer common, interoperable, and modular attributes to future warfighters under all circumstances, situations, or force structures. The CDL funds are expended for the initial development and demonstration of new data link capabilities and functions. In addition, these funds are leveraged with

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

other Service/Agency funds to provide data link capabilities that are applicable to multiple programs. Specific initiatives include the continuation of design, development, test and demonstration activities associated with common/interoperable communications and control capabilities for airborne reconnaissance platforms and sensors.

**Program Plans and Accomplishments: (\$ in millions)**

**FY1996 Accomplishments: (\$27.774)**

- Continued configuration control of CDL architecture, specifications and modules (\$2.063)
- Complete high rate COMSEC module development (\$1.500)
- Continued data link local area network (LAN) Asynchronous Transfer Mode (ATM) interface development (\$0.850)
- Continued covert waveform/miniaturation and air-to-air link development under the ABIT program(\$6.125)
- Continued CDL/laser communications data link demonstrations (\$5.000)
- Continued "next-generation" CDL Surface Terminal design based on open system architecture (\$1.000)
- Continued engineering and integration of commercial satellite communications network to support U-2, Predator and other airborne reconnaissance platform relay requirements (\$7.500)
- Continued DARP Integration and Support (\$3.736)

**FY1997 Plans: (\$23.688)**

- Continue configuration control of CDL architecture, specifications and modules (\$2.618)
- Demonstrate datalink LAN/ATM feasibility (\$0.325)
- Begin testing and evaluation of covert waveform miniaturization equipment air-to-air link with U-2 under the ABIT program (\$6.500)
- Support Laser Crosslink design and development (\$.650)
- Continue CDL "next generation" surface terminal design based on an open system design architecture (\$.173)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D	

- Continue development of commercial satellite communications network to support airborne reconnaissance platform relay requirements (expand partial coverage to four areas) (\$8.578)
- Begin Tactical CDL development activity (\$3.000)
- Begin SATCOM interoperability enhancement plans (\$.500)
- DARP Integration and Support (\$1.344)

**Obligation time frame for all FY97 funding will be from Oct 96 - Dec 97**

**FY1998 Plans: (\$44.396)**

- Continue configuration control of CDL architecture, specifications, and modules (\$3.491)
- Continue to assess development of commercial network interface standards and impact to CDL interface (\$1.000)
- Begin development of CDL interface to additional platforms (\$2.550)
- Continue engineering and integration of commercial satellite communication network to support airborne reconnaissance platform relay requirements (increase link capacity and depth of coverage) (\$17.500)
- Continue tactical CDL development activity (\$7.700)
- Continue SATCOM interoperability enhancements (\$1.355)
- Continue testing and evaluation of covert waveform miniaturization equipment air-to-air link with U-2 under the ABIT program (\$10.800)

**Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98**

**FY1999 Plans: (\$36.088)**

- Continue configuration control of CDL architecture, specifications, and modules (\$3.370)
- Continue development of CDL interface to additional platforms (\$4.045)
- Continue to access development of commercial network interface standards and impact to CDL interface (\$1.673)
- Continue engineering and integration of commercial satellite communication network to support airborne reconnaissance platform relay requirements (increase link capacity and depth of coverage) (\$19.000)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

- Complete covert waveform development/miniaturization/air-to-air link under the ABIT program for U-2 (\$3.000)
- Continue SATCOM interoperability enhancements (\$1.000)
- Complete Tactical CDL flight demonstration (\$4.000)

**Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99**

**Acquisition Strategy:** The CDL involves a multitude of technology projects which will provide for a common, interoperable wideband data link standard that has been mandated by ASD/C3I policy. Program funds are leveraged with the Service program funds to satisfy project objectives. Funds are provided to various government laboratories and program offices to fund on-going technology efforts. The individual Services use Engineering Change Proposals (ECPs) and modify existing contracts that have been awarded both competitively and on a sole source basis to implement various technology efforts.

#### **B. Program Change Summary**

	<b>FY1996*</b>	<b>FY1997*</b>	<b>FY1998</b>	<b>FY1999</b>	<b>Total Cost</b>
Previous President's Budget	45.0	29.4	43.5	37.0	continuing
Appropriated Value	50.0	22.9			
Adjustments to Appropriated Value					
a. Undistributed Reductions	(7.6)	(.9)			
b. Realignments	(14.6)	1.7			
President's Budget Request	27.8	23.7	44.4	36.1	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D	

Change Summary Explanation:

Funding: Funds were realigned within this PE and project to support higher priority program requirements including U-2 ASARS Improvement Program and Advanced Technology development activities. Funds were also realigned to UAV programs to satisfy high priority shortfalls in those programs.

Schedule: N/A

Technical: N/A

C. Other Program Funding Summary Cost

	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
N/A										

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D

#### D. Schedule Profile

Fiscal Year actual and planned events by quarter

	<u>FY1996 *</u>				<u>FY1997 *</u>				<u>FY1998</u>				<u>FY1999</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

#### Other Program Events

High Rate COMSEC Module Delivery X

Senior SPUR Data Link Deliveries X

Commercial Satellite Integration  
Region 1 with 1 Transponder X

Completed FINDS Demonstration X

Commercial Satellite Integration  
Region 2 with 1 Transponder X

Commercial Satellite Integration Regions 3 and 4 X

Advanced Comms Study Completed X

CDL Specification update Completed X

Laser Cross Link SRR X

ATM Phase I Study Completed X  
\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		
Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D		

#### D. Schedule Profile

Fiscal Year actual and planned events by quarter

	<u>FY1996 *</u>				<u>FY1997 *</u>				<u>FY1998</u>				<u>FY1999</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Vanishing Vendor Study Phase I Complete					X											
Laser Crosslink PDR					X											
Battlefield Awareness and Data Dissemination Demo					X											
Start Tactical CDL Phase 1 Design Studies								X								
Laser Crosslink CDR								X								
AIP/TIDGL ATM Interoperability Study Complete								X								
ATM Phase 2 Study Complete								X								
Start Tactical CDL Phase 2 Detail Design/ CDL Interoperability Testing													X			
U-2 ABIT Prototype Delivery													X			
SATCOM Interoperability Study Complete									X							

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

#### D. Schedule Profile

Fiscal Year actual and planned events by quarter

	<u>FY1996 *</u>				<u>FY1997 *</u>				<u>FY1998</u>				<u>FY1999</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

#### Other Program Events

ABIT U-2 Testing Complete

X

Tactical CDL Flight Demonstration

X

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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EXHIBIT R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305206D/P810	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**Common Data Link**

**A. Project Cost Breakdown**

	(\$ in millions)		
	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u> <u>FY1999</u>
1. Primary Hardware Development	8.760	4.836	17.127      7.638
2. Development Support Equipment	3.685	2.683	2.988      2.823
3. Systems Engineering	1.774	2.188	2.800      2.993
4. Reliability, Maintainability, and Availability	3.266	5.710	12.782      13.334
5. Configuration Management	2.129	2.470	3.491      3.370
6. Contractor Engineering Support	2.604	2.685	3.465      4.118
7. Government Engineering Support	1.820	1.772	1.743      1.812
8. DARP Integration and Support	3.736	1.344	**      **
<b>TOTALS</b>	27.774	23.688	44.396      36.088

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

\*\*FY 1998 and out-year funds for DARP I & S are justified under PE 0305209D.

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EXHIBIT R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN			DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-I ITEM NOMENCLATURE	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Defense Airborne Reconnaissance Program (DAR) PE 0305206D/P810	

#### B. Budget Acquisition History and Planning Information.

##### Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
<b>Product Development Organizations</b>											
Lockheed-Martin					8.750	4.967	5.448	7.947	2.100	continuing	continuing
Loral Communications					19.937	2.100				0.000	22.037
Motorola					2.700	1.500				0.000	4.200
Thermotrex					1.327	4.200	.250			continuing	continuing
VEDA						.550	.200			continuing	continuing
Other Non-Prime Contracts and Gov't Organizations					6.387	3.720	4.483	2.694	2.261	continuing	continuing
Tactical CDL design - vendor - TBD							2.406	6.161	2.606	continuing	continuing
Networking Support vendor - TBD								1.000	2.673	continuing	continuing
Air-Air Vendor									3.633	continuing	continuing
<b>Subtotal</b>					39.101	17.037	12.787	17.802	13.273	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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EXHIBIT R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN			DATE
APPROPRIATION/BUDGET ACTIVITY			February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7			R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305206D/P810

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Support and Management Organizations											
COMSAT, RSI					5.500	6.600	7.415	15.400	16.720	continuing	continuing
Other Non-Prime Contractors and Gov't Organizations					5.843	4.137	3.486	11.194	6.095	continuing	continuing
Subtotal					11.343	10.737	10.901	26.594	22.815	continuing	continuing
Test and Evaluation Organizations N/A											
Product Development Subtotal					39.101	17.037	12.787	17.802	13.273	continuing	continuing
Support & Management Subtotal					11.343	10.737	10.901	26.594	22.815	continuing	continuing
Test & Evaluation Subtotal N/A											
Government Furnished Property Subtotal N/A											
PROJECT TOTAL					50.444	27.774	23.688	44.396	36.088	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-I ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Manned Reconnaissance Systems PE 0305207D	

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	29.924	27.259	26.784	11.133	6.027	5.895	6.041	6.199	continuing	continuing
Project Name/No. and Subtotal Cost Manned Reconnaissance Systems U-2/P811	29.924	27.259	26.784	11.133	6.027	5.895	6.041	6.199	continuing	continuing
Quantity of RDT&E Articles										

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** Manned reconnaissance programs provide for a wide variety of reconnaissance tasks in support of the entire range of users from the tactical level to the national command authority. Signals Intelligence, Imagery, Measurement and Signatures Intelligence, Target Acquisition, and Surveillance missions are performed by manned reconnaissance systems, across the spectrum of conflict. Manned reconnaissance systems also conduct missions in support of counter narcotics, disaster relief, mapping, charting and geodesy, scientific requirements, military and operations other than war. This element provides for manned reconnaissance platforms resident in the DARPA. The activity ensures continued viability of both the platforms and the associated sensors as mission requirements and threats change. As the DARO moves forward to greater commonality among systems, this element develops a means of compliance with the emerging architecture. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Manned Reconnaissance Systems PE 0305207D	

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	29,924	27,259	26,784	11,133	6,027	5,895	6,041	6,199	continuing	continuing
Total Project Cost/No.	29,924	27,259	26,784	11,133	6,027	5,895	6,041	6,199	continuing	continuing
Subtotal Cost										
U-2/P811										
Quantity of RDT&E Articles										

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** The U-2 Program provides unique capabilities to remotely collect and relay signals to Remote Operating Facility Airborne (ROFA), either directly via satellite or indirectly through ground satellite relay stations. This element provides RDT&E for the continued enhancement of capabilities to receive and exploit those signals. This program also funds the RDT&E portion of high payoff upgrades for the U-2 Advanced Synthetic Aperture Radar System (ASARS-2). ASARS-2 upgrades and modifications will extend the usable life of this critical sensor as well as enhance its area search, precision geolocation, and image quality characteristics sufficiently to support the targeting of precision guided munitions (PGMs). Several key Line Replaceable Units (LRUs) including the Process Control Unit (PCU), receiver - exciter, and waveform generator are approaching the end of their supportability life. Replacing the LRUs with next generation technology will make ASARS-2 supportable through the expected service life of the U-2 and provide capability enhancements necessary to support PGMs. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

Note: The ASARS 2 portion of the U-2 Program was previously justified in separate budget documents under the title "U-2 Support for Precision Guided Munitions".

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Manned Reconnaissance Systems PE 0305207D	

**Program Accomplishments and Plans: (\$ in millions)**

**FY1996 Accomplishments: (\$29.924)**

- Initiate ASARS-2 retrofit item development (\$15.801)
- Upgrade airborne collection capabilities (\$3.969)
- Deploy and test integrated airborne-ground processing (\$0.488)
- Initiate system design, develop engineering plans, and begin development of prototype defensive system (\$8.966)
- DARP Integration and Support (\$0.700)

**FY1997 Plans: (\$27.259)**

- Upgrade airborne collection capabilities (\$3.822)
- ASARS-2 Radar hardware development (\$ 7.968)
- ASARS-2 Radar software development (\$ 8.698)
- ASARS-2 Integration and flight test (\$ 4.416)
- ASARS-2 Data link (\$ 1.063)
- DARP Integration and support (\$1.292)

**Obligation time frame for all FY97 funding will be from Oct 96 - Dec 97**

**FY1998 Plans: (\$26.784)**

- Upgrade airborne collection capabilities (\$3.390)
- ASARS 2 Radar hardware development (\$8.225)
- ASARS 2 Radar software development (\$9.569)
- ASARS 2 Integration & flight test (\$4.600)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Manned Reconnaissance Systems PE 0305207D	

- ASARS 2 Data Link (\$1.000)

**Obligation time frame for all FY97 funding will be from Oct 97 - Dec 98**

**FY1999 Plans: (\$11.133)**

- Upgrade airborne collection capabilities (\$3.833)
- Upgrade ground/PME capabilities (\$2.300)
- ASARS 2 Radar hardware development (\$1.000)
- ASARS 2 Radar software development (\$1.730)
- ASARS 2 Integration and flight test (\$2.000)
- ASARS 2 Data Link (\$.270)

**Obligation time frame for all FY97 funding will be from Oct 98 - Dec 99**

**Acquisition Strategy:**

For airborne collection capability upgrades, modify existing platform and associated ground control equipment via Engineering Change Proposals (ECPs)/Task orders to existing USAF and NSA contracts. For defensive system capability add, select defensive system candidate from currently available systems, then evaluate and test on the U-2 aircraft. For ASARS-2, develop and test new technology line replaceable units (LRU's) for subsequent retrofit into the U-2's during normal U-2 Programmed Depot Maintenance (PDM), or during other ongoing U-2 modifications. LRUs for subsequent installation during PDM will be funded by the Air Force.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Manned Reconnaissance Systems PE 0305207D
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**B. Program Change Summary**

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	<u>Total Cost</u>
Previous President's Budget Appropriated Value	4.6	28.3	37.9	6.7	continuing
Adjustments to Appropriated Value	24.6	28.3			
a. Undistributed Reduction	(1.7)	(.7)			
b. Realignments	7.0	(.3)			
President's Budget Request	29.9	27.3	26.8	11.1	continuing
* FY 1997 and prior funding is justified as part of Program Element 0305154D.					

**Change Summary Explanation:**

Funding: Funds were added in FY96 to align ASARS-2 program schedule with original program requirements.

Schedule: N/A

Technical: N/A

**C. Other Program Funding Summary Cost**

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	<u>To Complete</u>	<u>Total Cost</u>
Procurement, DW (U-2 SATCOM)		2.023								2.023

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION									
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE				
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7					Manned Reconnaissance Systems PE 0305207D				

#### D. Schedule Profile

Fiscal Year actual and planned events by quarter

FY1996 *					FY1997 *					FY1998					FY1999				
1	2	3	4		1	2	3	4		1	2	3	4		1	2	3	4	
					X					X					X				
							X				X								
					X					X									
								X											

#### Engineering Milestones N/A

See Note: SRR/SDR

See Note: CDR

ASARS Improvement Program PDR

ASARS Improvement Program CDR

#### Test & Evaluation Milestones N/A

See Note:

#### Contract Milestones

See Note: Award

#### Other Program Events

ASARS Improvem't Prog Contingency IOC

ASARS Improvem't Prog Production IOC

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

Note: This line funds Quick Reaction Capability (QRC) Upgrades to the U-2 sensor to allow response to emergency, high priority threats. Project duration varies depending on complexity—between 9 and 21 months from definition through integration and test.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAK DOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Manned Reconnaissance Systems PE 0305207D/P811	
RDTE, DEFENSE-WIDE/BUDGET ACTIVITY 7		

U-2A. Project Cost Breakdown

(\$ in millions)

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>
1. Primary Hardware Development	13.013	8.290	8.658	3.267
2. Software Development	2.831	9.414	9.226	1.903
3. Systems Engineering	11.724	4.955	5.664	2.259
4. Integrated Logistics Support	0.345	0.569	.546	0.697
5. DT&E	0.311	0.139	.158	2.660
6. Contractor Engineering Support	1.000	2.600	2.532	0.347
7. DARP Integration and Support	0.700	1.292	**	**
<b>TOTALS</b>	29.924	27.259	26.784	11.133

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

\*\* FY 1998 and out-year funds for DARP I&amp;S are justified under PE 0305209D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAK DOWN			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Manned Reconnaissance Systems PE 0305207D/P811	

### B. Budget Acquisition History and Planning Information.

#### Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
<b>Product Development Organizations</b>											
Hughes (ASARS-2)	CPIFF	3Q96	N/A	N/A		15.772	23.437	23.668	5.000		62.316
Def Sys (contr TBD)	TBD	4Q96	TBD	N/A		8.966					8.966
Various	Various	Multiple	N/A	N/A	2.263	5.186	3.822	3.116	6.133	continuing	continuing
<b>Support and Management Organizations</b>											
<b>Test and Evaluation Organizations</b>											
<b>Government Furnished Property</b>											
N/A											
<b>Product Development Subtotal</b>											
					2.263	29.924	27.259	26.784	11.133	continuing	continuing
<b>Support &amp; Management Subtotal</b>											
<b>Test &amp; Evaluation Subtotal</b>											
<b>Government Furnished Property Subtotal</b>											
<b>TOTAL PROJECT</b>											
					2.263	29.924	27.259	26.784	11.133	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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## Exhibit R-2, RDT&amp;E BUDGET ITEM JUSTIFICATION

APPROPRIATION/BUDGET ACTIVITY		DATE
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		February 1997
R-1 ITEM NOMENCLATURE		
Distributed Common Ground Systems (DCGS)		
PE 0305208D		

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE cost.	52.510	57.725	37.653	33.897	27.680	29.402	28.874	28.665	continuing	continuing
Project Name/No. and Subtotal Cost: Airborne Reconnaissance Ground SIGINT Systems (ARGSS)/P812	1.308	2.304	0.418	0.000	0.000	0.000	0.000	0.000	0.000	4.030
Project Name/No. and Subtotal Cost: Common Imagery Ground/Surface Systems (CIGSS)/P813	41.526	50.548	30.377	28.084	22.099	23.970	23.353	22.948	continuing	continuing
Project Name/No. and Subtotal Cost: Distributed Common Ground System Interoperability (DCGSI)/P814	9.676	4.873	6.858	5.813	5.581	5.432	5.521	5.717	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

### A. Mission Description and Budget Item Justification

**Brief Description of Element:** The Distributed Common Ground System (DCGS) Program provides a system capable of receiving, processing, exploiting, and disseminating data from airborne and national reconnaissance platforms. The DCGS program is developing a family of systems, both fixed and deployable, that is capable of supporting all levels of conflict, is interoperable with all reconnaissance platforms and sensors, and is integrated into the Joint C4I environment. The program consists of Common Imagery Ground/Surface Systems (CIGSS) which process and exploit imagery data, Airborne Reconnaissance Ground SIGINT Systems (ARGSS) which process and exploit SIGINT data, which support inter-intelligence interoperability initiatives that process, exploit, and correlate data simultaneously for multi-intelligence sources, and Distributed Common Ground System Interoperability (DCGSI) which focuses on IMINT, SIGINT and multi-discipline system flexibility and interoperability. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Distributed Common Ground Systems (DCGS) PE 0305208D	

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	52.510	57.725	37.653	33.897	27.680	29.402	28.874	28.665	continuing	continuing
Project Name/No. and Subtotal Cost: Airborne Reconnaissance Ground SIGINT Systems (ARGSS)/P812	1.308	2.304	.418	0.000	.0000	0.000	0.000	0.000	0.000	0.418
Quantity of RDT&E Articles										

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** HEARTLEAF adds two additional ground station processing capabilities at a centralized facility that will receive, process, and disseminate information from national, theater, and tactical reconnaissance sensors. It provides a centralized facility that will ensure commonality between ground systems and airborne sensors. EAGLE TOT will develop hardware and software modifications for the C-ROFA to allow receipt of U.S. and Allied radar data from airborne platforms. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

#### Program Accomplishments and Plans: (\$ in millions)

##### FY1996 Accomplishments: (\$1.308)

- Deployed and tested HEARTLEAF (\$0.934)
- Initiated development of additional reporting channels (EAGLE TOT) (\$0.333)
- DARP Integration and Support (\$0.041)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**FY1997 Plans: (\$2.304)**

- Field HEARTLEAF (\$0.303)
- Complete development of additional reporting channel (EAGLE TOT) (\$1.891)
- DARP Integration and Support (\$0.110)

**Obligation time frame for all FY97 funding is from Oct 96 - Dec 97**

**FY1998 Plans: (\$0.418)**

- Field additional reporting channel (EAGLE TOT) to remote sites (\$0.418)

**Obligation time frame for all FY98 funding is from Oct 97- Dec 98**

**Acquisition Strategy:** Develop integrated ground architecture and distributed communications capability via ECP/Task orders to existing USAF and NSA W contracts.

**B. Program Change Summary**

	<b><u>FY1996*</u></b>	<b><u>FY1997*</u></b>	<b><u>FY1998</u></b>	<b><u>FY1999</u></b>	<b>Total</b>
Previous President's Budget	1.4	2.4	.4		<b>Cost</b> 4.2
Appropriated Value	1.4	2.4			3.8
Adjustments to Appropriated Value					
a. Undistributed Reduction	(.1)	(.1)			(.2)
b. Realignments					
President's Budget Request	1.3	2.3	.4		4.0

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

## B. Program Change Summary

Funding: N/A  
Schedule: N/A  
Technical: N/A

## C. Other Program Funding Summary Cost

	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
ARGSS, Proc, DW			3.382	3.579						6.961

## D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1996 *				FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Acquisition Milestones</b>																
SENIOR SPAN ROFA West (SSRW) FOC																
Retire ROFA, Replaced by SSRW																
Begin Consolidated ROFA Upgrade																
Begin Enhanced Tactical Reporting																
Capability Integration																
DGIF-2 Commonality Upgrade																
Complete Enhanced Tactical Reporting																
Capability																

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D/P812	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

### Airborne Reconnaissance Ground SIGINT Systems (ARGSS)

#### A. Project Cost Breakdown

	FY1996*	( \$ in millions ) FY1997*	FY1998	FY1999
1. Primary Hardware Development	0.150	1.191	0.000	0.000
2. Software Development	0.271	0.340	0.000	0.000
3. Systems Engineering	0.350	0.296	0.094	0.000
4. Integrated Logistics Support	0.412	0.399	0.145	0.000
5. DT&E	0.075	0.000	0.030	0.000
6. Contractor Engineering Support	0.000	0.000	0.129	0.000
7. Miscellaneous	0.050	0.078	0.020	0.000
<b>TOTALS</b>	1.308	2.304	0.418	0.000

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

#### B. Budget Acquisition History and Planning Information N/A

This program does not meet the criteria of Chapter 5, DoD 7000.14-R

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Distributed Common Ground Systems (DCGS) PE 0305208D	

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	52.510	57.725	37.653	33.897	27.680	29.402	28.874	28.665	continuing	continuing
Project Name/No. and Subtotal Cost: Common Imagery Ground/Surface Systems (CIGSS)/P813	41.526	50.548	30.377	28.084	22.099	23.970	23.353	22.948	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** This project supports the engineering development and acquisition of Service imagery ground/surface systems. The Common Imagery Ground/Surface System (CIGSS) is a Department of Defense (DoD) project aggregating all imagery ground/surface systems into a single Defense Airborne Reconnaissance Office (DARO) project. The CIGSS objective is to enable all systems to receive, process, exploit, and report any imagery source regardless of platform or sensor type to meet the intelligence and targeting needs of tactical commanders. The CIGSS project provides the warfighter with an integrated and interoperable airborne reconnaissance imagery processing and exploitation capability that can be tailored for all levels of conflict. CIGSS consolidates the JROC and DARSC approved restructure of the Joint Service Imagery Processing System (JSIPS) program including JSIPS-Army, JSIPS-Navy, JSIPS-Air Force, JSIPS-Marine Corps, Enhanced Tactical Radar Correlator (ETRAC), Modernized Imagery Exploitation System (MIES), PACAF Interim National Exploitation System (PINES), and Tactical Exploitation Group (TEG) into a single DARO project. The Navy CIGSS component, JSIPS-N, includes three major components, the Digital Imagery Workstation Suite Afloat (DIWSA), the National Input Segment (NIS), and a subset of equipment from the Tactical Input Segment (TIS). DIWSA receives, exploits, and disseminates imagery products based on multi-source imagery. The NIS and TIS provide the capability to receive, record, and process imagery from multiple sources. The Air Force CIGSS component consists of two deployable JSIPS systems and the fixed PINES system. The Army CIGSS components consists of the MIES and ETRAC systems. MIES receives and exploits imagery from national and theater sources and provides intelligence reports and exploited imagery products to the field commander. ETRAC is a C-130 drive on/off capable system that receives Synthetic Aperture Radar (SAR) data inputs from various platforms, converts the SAR data to exploitable images, and is capable of stand-alone operations. The Marine Corps

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

component of CIGSS consists of a JSIPS system identical to the Air Force JSIPS and three JSIPS variants referred to as the Tactical Exploitation Group (TEG). It will be a small, highly mobile system that will provide the Marine Expeditionary Forces (MEFs) with the capability of processing and exploiting SAR and Electro-Optical/Infra-Red (EO/IR) imagery from theater and tactical reconnaissance aircraft. A mobile CIGSS testbed will be developed to support the integration and test of CIGSS components and validation of interfaces prior to the introduction of CIGSS into the operational environment. The testbed will also be used by Program Offices to test interfaces with new sensors, applications, and other modifications. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

**Program Accomplishments and Plans: (\$ in millions)**

**FY1996 Accomplishments: (\$41.526)**

- Continued ATARS/UAV Exploitation Algorithm Development (N) (\$0.738)
- Continued DIWSA enhancements (N) (\$2.500)
- Continued DIWSA/TIS software support (N) (\$0.325)
- Continued DIWSA/TIS systems engineering (N) (\$0.700)
- Continued DIWSA/TIS test and evaluation support (N) (\$0.150)
- Continued independent validation and verification (N) (\$0.306)
- Completed development of ETRAC #2 (A) (\$4.700)
- Continued sustaining engineering for MIES and CIGSS systems to implement software upgrades and enhancements to maintain compatibility with changing national interfaces including Enhanced Automated Reporting Systems (EARS), RPC, Enhanced Processing System (EPS), Image Product Archive (IPA), and Enhanced Collection Systems (ECS) into MIES and ASARS Software (ARS) integration into ETRAC (A) (\$1.099).
- Initiated development of IESS integration into ETRAC for CIGSS compliance (A) (\$0.377)
- Upgraded MIES with Asynchronous Transfer Mode (ATM) LAN COTS for CIGSS compliance (A) (\$1.342)
- Continued integration of IESS into MIES (A) (\$2.000)
- Retrofitted ETRAC #1 with Redundant Array Inexpensive Disk (RAID) capability (A) (\$0.900)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY		February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		
		R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D

- Upgraded ETRAC I and II with 8MM NITF format, DCRSI, Predator Tier II Interface, Trojan BARE Interface, MAE UAV, and search enhancements (A) (\$2.749)
- Continued JSIPS Block upgrades (AF) (\$2.468)
- Continued development of Common Imagery Ground/Surface System/Testbed (AF) (\$3.760)
- Initiated development of Common Imagery Ground Processor (DARO) (\$9.200)
- Initiated development of downsized data link (AF) (\$4.500)
- Continued system engineering and technical support (AF) (\$1.440)
- Continued development of TEG (AF) (\$1.000)
- DARP Integration & Support (\$1.272)

**FY1997 Plans: (\$50.548)**

- Continue UAV exploitation algorithm development (N) (\$0.494)
- Initiate DIWSA/ATARS integration (N) (\$0.308)
- Initiate F-18 test flight (N) (\$0.100)
- Continue DIWSA/TIS/NIS software support (N) (\$0.476)
- Continue DIWSA/TIS/NIS systems engineering (N) (\$0.916)
- Continue DIWSA/TIS/NIS test and evaluation support (N) (\$0.754)
- Continue Independent Validation and Verification (N) (\$0.350)
- Continue IESS support (N) (\$0.535)
- Continue CIGSS elements sustaining engineering to implement software upgrades and enhancements to maintain compatibility with changing national interfaces (\$8.219)
- Complete integration of IESS into ETRAC/MIES (A) (\$2.000)
- Initiate ETRAC sustaining engineering to implement upgrades to ASARS-2 sensor from the ASARS improvement program (A) (\$1.679)
- Continue upgrade MIES with ATM LAN for CIGSS compliance (A) (\$2.255)
- Complete JSIPS Block upgrades (AF) (\$2.400)
- Continue development of Common Ground/Surface System/Testbed (AF) (\$2.600)
- Continue system engineering and technical support (AF) (\$1.382)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Distributed Common Ground Systems (DCGS) PE 0305208D	

- Support Conventional HAE and LO HAE UAV demonstration test with CIGSS testbed (AF) (\$0.625)
- Continue development of Common Imagery Processor (CIP) (DARO) (\$17.187)
- Initiate efforts to integrate the TEG and the TIS (AF) (\$6.087)
- DARP Integration & Support (\$2.181)

**Obligation time frame for all FY97 funding is from Oct 96- Dec 97**

**FY1998 Plans: (\$30.377)**

- Continue UAV exploitation algorithm development (N) (\$0.280)
- Continue Tactical Input Segment (TIS) systems engineering (N) (\$0.495)
- Continue independent validation and verification (N) (\$0.447)
- Continue Test and Evaluation support (N) (\$0.532)
- Complete upgrade of MIES with ATM LAN for CIGSS Compliance (A) (\$0.200)
- Initiate upgrade of ETRAC Common Data Link (CDL) with ATM compatibility for CIGSS Compliance (A) (\$2.000)
- Continue CIGSS elements sustaining engineering to implement software upgrades and enhancements to maintain compatibility with changing national interfaces (A) (\$2.759)
- Integrate capabilities to receive/process radar imagery from High Altitude Endurance (HAE) Unmanned Aerial Vehicle (UAV) (A) (\$2.000)
- Continue CIGSS sustaining engineering to implement software upgrades and enhancements to maintain compatibility with changing national interfaces (\$8.914)
- Continue development of Common Ground/Surface System Testbed (AF) (\$2.400)
- Continue system engineering and technical support (AF) (\$1.350)
- Upgrades for JSIPS/TEG to remain compliant and interoperable with Distributed Common Ground Station Architecture (AF) (\$2.600)
- Complete efforts to integrate the TEG and the TIS (AF) (\$2.400)
- Continue evolving CIP to keep pace with current and projected modification programs (DARO) (\$4.000)

**Obligation time frame for all FY98 funding is from Oct 97 - Dec 98**

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Distributed Common Ground Systems (DCGS) PE 0305208D	

**FY1999 Plans: (\$28.084)**

- Continue UAV exploitation algorithm development (N) (\$0.697)
- Continue Tactical Input Segment (TIS) systems engineering (N) (\$0.664)
- Continue Independent Validation and Verification (IV&V) (N) (\$0.752)
- Continue Test and Evaluation (T&E) Support (N) (\$0.502)
- Continue CIGSS elements sustaining engineering to implement software upgrades and enhancements to maintain compatibility with changing national interfaces (A) (\$5.787)
- Complete upgrade to ETRAC with ATM LAN (A) (\$2.000)
- Integrate Semi-automated Imagery Processor (SAIP) capability into ETRAC (A) (\$1.500)
- Continue CIGSS sustaining engineering to implement software upgrades and enhancements to maintain compatibility with changing national and tactical interfaces (AF) (\$8.323)
- Continue Common Ground/Surface System Testbed development (AF) (\$2.600)
- Continue system engineering technical support (AF) (\$1.750)
- Continue evolving CIP to keep pace with current and projected modification programs (DARO) (\$3.509)

**Obligation time frame for all FY99 funding is from Oct 98 - Dec 99**

**Acquisition Strategy:** As approved by the Joint Requirements Oversight Council (JROC), Defense Airborne Reconnaissance Steering Committee (DARSC), and Under Secretary of Defense (Acquisition & Technology) a family of rapidly deployable imagery ground/surface systems, capable of operating in the Joint C4I environment and tailorable to support all levels of conflict will be developed. These systems are under the umbrella program called the Common Imagery Ground/Surface System (CIGSS). An acquisition baseline was established for CIGSS outlining JROC approved joint requirements and DARO/NIMA approved standards. All existing imagery ground/surface systems, and those currently in the pipeline, will be modified to meet the CIGSS acquisition baseline. All new imagery ground/surface systems must be delivered CIGSS compliant. Program management responsibility for CIGSS systems will rest with the individual Service or Agency developing the CIGSS system. The systems will be acquired using streamlined acquisition procedures. DARO will provide oversight to ensure compliance with joint airborne reconnaissance architectures, requirements, and standards.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Distributed Common Ground Systems (DCGS) PE 0305208D	

### B. Program Change Summary

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	Total Cost
Previous President's Budget	33.8	47.8	35.3	13.7	continuing
Appropriated Value	44.8	55.3			
Adjustments to Appropriated Value					
a. Undistributed Reduction	(3.1)	(4.8)			
b. Realignments	(.2)	.1			
President's Budget Request	41.5	50.6	30.4	28.1	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

### Change Summary Explanation:

Funding: Changes are due to Program Budget Decisions and programmatic decisions.

Schedule: N/A

Technical: N/A

### C. Other Program Funding Summary Cost

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	To Complete	Total Cost
CIGSS Proc, Defense Wide	80.882	89.945	94.070	81.600	80.576	71.867	73.926	75.239	cont	cont

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

**Related Activities:** To ensure no duplication of effort, this project is coordinated with the Office of the Secretary of Defense, Army, Air Force, Marine Corps, and Navy TENCAP offices, CIO, DIA, and other agencies. The Defense Airborne Reconnaissance Office (DARO) assures coordination across the DARP through program reviews.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION									
APPROPRIATION/BUDGET ACTIVITY								DATE February 1997	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7								R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D	

**D. Schedule Profile**

Fiscal Year actual and planned events by quarter

	<u>FY1996 *</u>				<u>FY1997 *</u>				<u>FY1998</u>				<u>FY1999</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Acquisition Milestones</b>																
N-TIS Low Rate Initial Production (LRIP)																X

**Engineering Milestones**

User Test ETRAC #1	X															
User Test ETRAC #2																X

**Test & Evaluation Milestones**

JSIPS-N DT - IIC Tech Evaluation					X											
JSIPS-N OT - IIC						X										
Complete Accreditation of National JSIPS							X									

**Contract Milestones**

RMS Integration (MIES)																	
Field ETRAC #2					X												
Integrate National RFCs																	
Integrate SAIP Capability into ETRAC																	X
Upgrade CDL for ATM Capability into ETRAC																	
Integrate ECOs																	X
CIGSS Testbed ATARS Testing																	X

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION									
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D				
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7									

#### D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1996 *				FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Integrate IESS into MIES									X							
Integrate IESS into ETRAC																
LRIP Unit 1 Delivery to AF																
N-TIS Development																
JSIPS-N CSARP Integration																
Integrate HAE/UAV Capabilities into ETRAC																X

#### Other Program Events

JSIPS-N MS Full Rate Production (FRP)									X							
Integrate GSD/RPC into MIES																X
Integrate TEG and TIS																

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN			DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Distributed Common Ground Systems (DCGS) PE 0305208D/P813	

Common Imagery Ground/Surface System (CIGSS)A. Project Cost Breakdown

	FY1996*	FY1997*	FY1998	FY1999
	(\$ in millions)			
1. Primary Hardware Development	15.065	13.765	6.484	0.108
2. Primary Hardware Acquisition	4.179	1.340	1.983	1.924
3. Software Development	8.929	17.675	6.982	11.716
4. System Engineering	5.003	7.396	9.136	7.205
5. System Integration & Testing	.623	.646	0.432	0.515
6. Training & Development	.581	.753	0.851	1.880
7. Program Management	.947	.806	0.527	0.522
8. Systems Analysis	.092	.352	0.282	0.719
9. Configuration Management	.500	.697	0.608	0.331
10. Development Test & Evaluation	.050	.037	0.120	0.032
11. Technical Data & Documentation	.050	.037	0.040	0.030
12. Contract Engineering Support	.325	.476	0.000	0.000
13. Operational Test & Evaluation	.150	.854	0.532	0.502
14. Ancillary Hardware Development (N)	3.760	3.533	2.400	2.600
15. DARP Integration & Support	1.272	2.181	**	**
<b>TOTAL</b>	41.526	50.548	30.377	28.084

\* FY 97 and prior funding is justified as part of Program Element 0305154D.

\*\* FY 1998 and out-year funds for DARP I&amp;S are justified under PE 0305209D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Distributed Common Ground Systems (DCGS) PE 0305208D/P813	

### B. Budget Acquisition History and Planning Information Performing Organizations

Contract/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
<b>Product Development Organizations</b>											
DBA Systems Melbourne, FL	CPFF	4Q94	TEC	ASPO	2.895	4.041	3.807	3.342	3.780	continuing	continuing
Northrop Grumman Baltimore MD	CPAF	3Q93	Classified	ASPO	9.870	9.126	6.146	3.617	5.507	continuing	continuing
E-Systems** Garland, TX	FFP	Aug 87			2.449	2.468	0.000			continuing	continuing
Northrop Grumman Baltimore MD	CPFF	1Q97	(TBD)		3.762	3.781	17.151	4.000			28.694
GDE Systems Rancho Bernardo, CA	TBD				1.768	3.238	1.360	0.812	1.199	continuing	continuing
NAWC Pt Mugu	MIPR				8.204	1.000	.200			continuing	continuing
CIGSS Upgrades/Migration	TBD					9.179	5.648	7.722	9.712	continuing	continuing
Other Non-Prime Government Contracts					2.367	0.000	3.000	6.360	3.509	continuing	continuing
TEG Datalink	TBD					4.500	4.500			continuing	continuing
Mitre	FFP	Annual			1.542	0.330	0.716	0.700	0.400	continuing	continuing
SAIC Arlington, VA	TBD	Dec 94			0.691	2.116	4.728	3.824	3.977	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

\*\* Contractors will continue to provide technology insertion, configuration control, and product improvement to stay current with National Programs and OSD/Army mandated upgrades.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN					DATE
APPROPRIATION/BUDGET ACTIVITY					February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7					
R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D/P813					

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY1996*	Budget FY1996*	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Support and Management Organizations											
Miscellaneous Organizations											
Test & Evaluation Organizations											
Naval Surface Warfare Center	Airtask	Dec 95				0.325	0.426			continuing	continuing
COMOPTEVFOR						0.150				continuing	continuing
Defense Dissemination Program Office (DDPO)	MIPR						0.535			continuing	continuing
NAS PAX River							0.100			continuing	continuing
Government Furnished Property N/A											
Product Development Subtotal											
					33.548	39.779	47.256	30.377	28.084	continuing	continuing
Support & Management Subtotal											
						1.272	2.231			continuing	continuing
Test & Evaluation Subtotal											
						0.475	1.061			continuing	continuing
Government Furnished Property Subtotal											
PROJECT TOTAL											
					33.548	41.526	50.548	30.377	28.084	continuing	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7			

COST (IN MILLIONS)	FY1996*	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	52.510	57.725	37.653	33.897	27.680	29.402	28.874	28.665	continuing	continuing
Project Name/No. and Subtotal Cost: Distributed Common Ground System Interoperability (DCGSI)/P814	9.676	4.873	6.858	5.813	5.581	5.432	5.521	5.717	continuing	continuing
Quantity of RDT&E Articles										

\* FY 1997 and prior funding is justified as part of Program Element 0305154D. Total PE costs shown for these years applies only to this program's portion of the total PE costs for 0305154D.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** The Distributed Common Ground System (DCGS) Interoperability project funds and coordinates engineering development work directed toward defense airborne reconnaissance ground processing technologies. The project will ensure that intelligence processing systems are developed to satisfy strategies and architectures that support warfighter intelligence needs in the face of rapidly developing threat technologies, proliferation of advanced weapons, and uncertain political alignments. This project supports IMINT, SIGINT, and multi-discipline system interoperability and consolidates the R&D efforts of the Ground/Surface System Development Program (GSSDP) project. This project focuses the DARO ground system efforts to improve flexibility, commonality, interoperability, and efficiency in supporting Joint Task Force and Service unique intelligence requirements. The DCGS is a system of systems that need not be collocated but must be interconnected by a robust communications structure that will provide data streams between intelligence collector, exploiters, producers, disseminators, and users. The DCGS Interoperability Project goal is to provide a near-real-time, day/night, all weather intelligence processing system which meets the warfighter's need for timely intelligence on enemy forces. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	DATE
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Defense Airborne Reconnaissance Program (DARP) PE 0305154D	February 1997

**Program Accomplishments and Plans: (\$ in millions)**

**FY1996 Accomplishments: (\$9.676)**

- Completed and transferred to the Air Force the ETP Relay Ground Segment (\$1.407)
- Continued working with the UAV Program Offices to develop systems performance definitions, systems architectures and interfaces for the integration of HAE and MAE into CIGGS (\$1.616)
- Continued to ensure pre-planned product improvements (P3Is) and advanced SIGINT technology is incorporated into ground/surface systems (\$0.505)
- Continued planning and integration activities to incorporate IPA, RMS, and CATIS/ESS into all CIGSS elements (\$2.293)
- Completed technology evaluation and continued migration toward a common imagery processor (\$1.009)
- Initiated CIGSS engineering development sub-systems compatibility and integration test using CIGSS testbed to support migration to DCGS (\$1.709)
- Conducted test of Service P3Is in the CIGSS Testbed prior to installation into operational systems. (\$0.698)
- Conducted test of the integration of F/A-18 ATARS imagery and CIGSS Testbed (\$0.277)
- Continued DARP Integration and Support (\$0.162)

**FY1997 Plans: (\$4.873)**

- Continue systems engineering and integration of UAV ground station into the CIGSS architecture (\$1.150)
- Demonstrate CIGSS "clip-kit" interoperability with HAE during test flight (\$0.100)
- Complete integration of Tactical Systems Reconnaissance Mission Planner & Reconnaissance Mission Control capability (\$0.410)
- Support Graphical Situation Display (GSD) reporting development under multi-"int" migration initiatives (\$.380)
- Test Service P3Is in CIGSS testbed prior to installing in operational systems (\$1.150)



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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Defense Airborne Reconnaissance Program (DARP) PE 0305154D	

- Continue efforts to migrate current ground/surface systems toward a DCGS (\$0.678)
- Initiate and complete the integration of the Tactical Systems Manager (TSM) into CIGSS Testbed (\$.471)
- Begin Joint Interoperability Test Center (JTIC) testing and certifying of CIGSS components for CIGSS compliance and certification (\$0.300)
- DARP Integration and Support (\$0.234)

**Obligation time frame for all FY97 funding is from Oct 96 - Dec 97**

**FY1998 Plans: (\$6.858)**

- Continue testing Service P3Is in CIGSS testbed prior to installing in operational Intelligence systems (\$1.750)
  - Continue efforts to migrate current ground/surface systems towards a Distributed Common Ground System (\$0.135)
  - Continue system engineering, integration, and testing of airborne sensors to ensure commonality and interoperability with the CIGSS Architecture (\$0.210)
  - Continue to ensure airborne SIGINT technology such as JASA is incorporated in ground/surface systems (\$0.302)
  - Continue planning, integration, configuration control, testing for CIGSS CORE (i.e., IPL/IPA, RMS, CATIS/IESS, TSM, sensor control, and CIP) components (\$1.436)
  - Initiate migration planning of the Distributed Common Ground Station (DCGS) as defined in DARO's "Integrated Airborne Reconnaissance Strategy (IARS)" (\$0.225)
  - Continue systems engineering and integration of UAV ground station into CIGSS (\$0.825)
  - Add additional sensor processing capability to Common Imagery Processor (CIP) (\$0.900)
  - Continue Joint Interoperability Test Center (JTIC) testing and certifying of CIGSS components for CIGSS compliance and certification (\$0.300)
  - Test Common Imagery Processor (CIP) for NTIF compliance and certification (\$0.300)
  - Develop and integrate Common Imagery Interface Profiles (CIIPs) into CIP (\$0.475)
- Obligation time frame for all FY98 funding is from Oct 97 - Dec 98**

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-I ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Defense Airborne Reconnaissance Program (DARP) PE 0305154D	

**FY1999 Plans: (\$5.813)**

- Continue testing migration core components within CIGSS testbed prior to installation into operational systems (\$1.080)
- Support integration of Asynchronous Transfer Mode (ATM) Network interface with Common Data Link within DCGS elements (\$0.970)
- Continue systems engineering and development for modification, integration and installation of Common Imagery Processor (CIP) units within the operational DCGS ground stations (\$0.800)
- Support integration of modified CIGSS Core (IPL, IEES, Tactical System Management (TSM)/Sensor Control) into fielded systems (\$0.863)
- Complete development and integration of HAE UAV ground station interfaces to exploitation ground station elements (\$0.900)
- Continue systems engineering support to CIGSS and maintenance of the interface description within baseline CIGSS architecture to include Tactical Exploitation System (TES) (\$0.500)
- Continue systems engineering and establish migration path from CIGSS baseline toward Multi-Intelligence Reconnaissance Ground System (MIRGS) objective baseline incorporating JASA and CIGSS standards (\$0.400)
- Continue Joint Interoperability Test Center (JTIC) testing and certifying of CIGSS components for CIGSS compliance and certification (\$0.300)

**Obligation time frame for all FY99 funding is from Oct 98 - Dec 99**

**Acquisition Strategy:** As outlined in the Integrated Airborne Reconnaissance Strategy (IARS) and approved by the JROC, DARSC, and Under Secretary of Defense, a family of fixed and rapidly deployable Distributed Common Ground Systems, capable of operating in the Joint C41 environment and tailorable to support all levels of conflict will be developed to support the nation's Defense Airborne Reconnaissance Systems. DARO is restructuring the Ground/Surface System Development program and the other DARO Ground/Surface Programs into the DCGS Program that includes the JSIPS program, GSSDP, Multi-intelligence Reconnaissance Ground Systems Projects (CARS and KCOIC), and Airborne Reconnaissance SIGINT Ground Systems (HEARTLEAF). DARO is establishing liaison with the UAV Program Offices to ensure interoperability with DARP ground systems. The development of modifications to ensure interoperability among these systems will be directed under DARO oversight, implemented by Service acquisition agencies and funded under this project.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY		February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305154D

**B. Program Change Summary**

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>	<u>Total Cost</u>
Previous President's Budget	9.6	5.1	7.3	6.2	continuing
Appropriated Value	9.6	5.1			
Adjustments to Appropriated Value					
a. Undistributed Reduction	(.7)	(.2)			
b. Realignments	.7	(.1)			
President's Budget Request	9.6	4.8	6.9	5.8	continuing

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

**Change Summary Explanation:**

Funding: Changes are due to Program Budget Decisions.

Schedule: N/A

Technical: N/A

**C. Other Program Funding Summary Cost**

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	<u>To Complete</u>	<u>Total Cost</u>
N/A										

#### **D. Schedule Profile**

<u>FY1996 *</u>				<u>FY1997 *</u>				<u>FY1998</u>				<u>FY1999</u>			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

X

### P3I Testbed Evaluations (IPA, RMS, CATIS/IESS)

X

X

## CSARP/APG-73 Capability

X

X

X

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D/P814	DATE February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

### Distributed Common Ground System Interoperability (DCGSI)

#### A. Project Cost Breakdown

	FY1996*	FY1997*	FY1998	FY1999
	(\$ in millions)			
1. Software development	0.000	0.380	1.375	0.900
2. Primary hardware development	1.407	0.000	0.000	0.000
3. Ancillary hardware development	3.909	2.238	0.872	0.900
4. Systems engineering	3.693	1.721	4.311	3.713
5. Development Test & Evaluation	0.000	0.300	0.300	0.300
6. Contract engineering support	.505	0.000	0.000	0.000
7. DARP Integration and Support	.162	.234	0.000	0.000
<b>TOTAL</b>	9.676	4.873	6.858	5.813

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

#### B. Budget Acquisition History and Planning Information N/A

This program does not meet the criteria of Chapter 5, DoD 7000.14-R

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Defense Airborne Reconnaissance Program (DARP) PE 0305209D	

COST (IN MILLIONS)	FY1996 *	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	[18.584]** .714***	[19.200]** .625***	20.543	22.180	22.741	23.393	24.060	24.748	continuing	continuing
Total Project Cost/No.										
Subtotal Cost										
DARP Integration & Support/P815	[18.584]** .714***	[19.200]** .625***	20.543	22.180	22.741	23.393	24.060	24.748	continuing	continuing
Quantity of RDT&E Articles										

\* FY 97 and prior years funding for this program are justified under PE 0305154D and recorded within the various projects supported by these activities.

\*\* Bracketed numbers are DARP Integration and Support requirements which were included as part of the individual projects in PE 0305154D. Because these funds were included in the funded lines of those individual projects, the dollars are presented here for informational purposes only and are not additive for this PE.

\*\*\* These funds pay for DARO civilian pay requirements and were previously included in the Airborne Reconnaissance Programs, project P525 as a separate sub-project, DARO Operations. Since DARO civilian pay cost are now funded in this new PE (0305209D), the FY 1996 and FY 1997 DARO Operations costs were moved from the Airborne Reconnaissance Program to this program for consistency in the presentations.

#### A. Mission Description and Budget Item Justification

**Brief Description of Element:** This project funds Defense Airborne Reconnaissance Office (DARO) operations and System Engineering and Technical Assistance (SETA) support for development, integration, and support functions necessary to meet DARO responsibilities for management and oversight of the Defense Airborne Reconnaissance Program (DARP), as specified in DoD Directive 5134.11 (5 April 1995). To satisfy these responsibilities the DARO establishes and maintains the DoD Integrated Airborne Reconnaissance Architecture to guide the development, demonstration, and acquisition of improved airborne reconnaissance capabilities. The DARO provides management oversight to ensure DARP programs comply with the airborne reconnaissance architecture, standards and warfighter requirements. The DARO also conducts trade-off analyses of Joint Military Department and Defense-wide manned and unmanned aerial vehicles (UAVs), sensors, data links, data relays, and associated processing systems to ensure future operational systems satisfy validated warfighter requirements using advanced concept technology demonstrations and innovative acquisition strategies to acquire advanced reconnaissance capabilities. These funds support the DARO activities necessary to establish and enforce commonality and interoperability standards for airborne reconnaissance systems, and they provide the DARO

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1971
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Defense Airborne Reconnaissance Program (DARP) PE 0305209D	

the capability to serve as the focal point for coordinating policies, standards, and architectures with all other OSD organizations. The funds give the DARO the capability to coordinate with the intelligence community on military intelligence needs, intelligence requirements analyses and priorities, resource planning and programming, exploitation management and intelligence data dissemination. DARO efforts to develop and advocate airborne reconnaissance capabilities to support the Unified Combatant Commanders, and provide USD (A&T) advice and supporting analysis on policies, systems, resources, and programs of the DARP are also funded here. The project funds program planning and resource guidance activities to support Military Departments and Defense Agencies in the development of DARP inputs to the DoD Planning, Programming and Budgeting process, and those activities necessary to develop and support the presentation and justification of DARP budget requests to the Congress. The project supports the planning and execution of JCS and test and evaluation sponsored demonstrations and exercises involving airborne reconnaissance, and funds the identification and analyses of the industrial base that supports and sustains improved airborne reconnaissance and surveillance for evolving Unified Combatant Commander requirements. Special studies and analyses directed by USD(A&T) are also directly supported by these funds. The activities identified in this PE were previously included as part of the individual programs within PE 0305154D. The functions are now presented in a separate PE to more clearly identify the work necessary to effectively oversee, coordinate, integrate, and standardize airborne reconnaissance capabilities, architectures, and technologies development within the Department and across the Services and Agencies. This program is categorized as Budget Activity 7 because it provides for the development of technologies and capabilities in support of operational system development.

Programs Plans and Accomplishments: (\$ in millions)

FY1996 Accomplishments: (\$19.298) [18.584] .714

- These funds supported DARO-led activities necessary to accomplish charter architecture and integration, project support and technical assessments, management analyses and functions common to multiple DARP projects, DARO civilian pay, security and administrative services. The DARP Integration and Support activities support system-level trade-offs, airborne reconnaissance technology base and industrial base analyses, architecture development, technology demonstrations, and exercises involving improved airborne reconnaissance systems and capabilities, and development/coordination of interoperability standards. The DARP Integration and Support efforts provided general benefit to multiple DARP programs and were funded from all DARP projects on a pro-rata basis within PE 0305154D. DARO civilian pay was separately funded and justified within PE 0305154D,

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE		
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Defense Airborne Reconnaissance Program (DARP) PE 0305209D	February 1997	

Airborne Reconnaissance Programs, Project P525. Based on FY1997 Congressional direction, the activities included in Integration and Support for FY1998 and all out-years are identified here under PE 0305209D, DARP Integration and Support.

**FY1997 Plans: (\$19.825) [19.200] .625**

- These funds supported DARO-led activities necessary to accomplish charter architecture and integration, project support and technical assessments, management analyses and functions common to multiple DARP projects, DARO civilian pay, security and administrative services. The DARP Integration and Support activities support system-level trade-offs, airborne reconnaissance technology base and industrial base analyses, architecture development, technology demonstrations, and exercises involving improved airborne reconnaissance systems and capabilities, and development/coordination of interoperability standards. The DARP Integration and Support efforts provided general benefit to multiple DARP programs and were funded from all DARP projects on a pro-rata basis within PE 0305154D. DARO civilian pay was separately funded and justified within PE 0305154D, Airborne Reconnaissance Programs, Project P525. Based on FY1997 Congressional direction, the activities included in Integration and Support for FY1998 and all out-years are identified here under PE 0305209D, DARP Integration and Support.

**FY1998 Plans: (\$20.543)**

- Continue technical assistance to provide support to:
  - Continue the assessment and refinement of the Department's integrated airborne reconnaissance architecture, accomplish campaign level analysis to assess its effectiveness in meeting the information needs of the warfighter, assess the military worth of current and planned airborne reconnaissance capabilities; determine efficient paths for migration to the DARP Objective architecture and ensure the compatibility of the DARP architecture with related architectures for JSTARS, the High Data Rate Communications architecture, and others (\$3.503)
  - Develop plans in conjunction with the program offices, services and users to transfer UAV capabilities to users, develop UAV operational plans and prioritize payloads (\$1.100)
  - Develop assessments and complete special studies to determine the programmatic, operational and budgetary impacts of changes to UAV requirements and operational needs (\$1.002)
  - Continue to direct and complete assessments of design issues for high data rate communications, Ku-band communications, and 100 Megapixel equivalent Infrared Framing cameras (\$.927)

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION			DATE
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		Defense Airborne Reconnaissance Program (DARP) PE 0305209D	

- Assess the impact of operational, technological and industrial requirements and changes on manned reconnaissance capabilities; update and publish the Manned Airborne Reconnaissance Program Plan to reflect necessary programmatic changes to meet future warfighter needs (\$1.090)
- Provide integration and associated engineering, and tracking support for the development of a Common Data Link (CDL), leasing of Commercial Satellite Communications Initiative (CSCI) transponders, and the development of Airborne Imagery Transmission system (ABIT) (\$1.670)
- Develop and support Advanced Development initiatives for Global Broadcast systems, High Band Prototype Demonstrations, JASF standards development and implementation requirements, ATARS tracking , JASA High Band Prototype Insertion tracking, and HSI FOPEN development engineering support (\$4.204)
- Continue integration and configuration control, and assess the effectiveness and military worth of ACTD exercises, deployments and demonstrations, including BADD, JTUAV, MAE, and High Altitude Endurance UAVs, Roving Sands and MOBSTER (\$2.095)
- Develop airborne reconnaissance SIGINT standards and provide engineering and integration support to the SR-71, U-2 and other manned reconnaissance assets (\$1.408)
- Continue the development and maintenance of DARP oversight financial data bases and studies; develop and coordinate DARP budget justifications with executing agents, provide special studies and reports as necessary to support DARSC, EDRB, and other Departmental and Congressional requirements (\$1.517)
- Provide salaries for assigned Civil Service employees, and provide DARO administrative, MIS, and Security support (\$2.027)

**Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98**

**FY1999 Plans: (\$22.180)**

- Technical assistance will be provided to support:
  - Perform continuing analysis of the effectiveness and military worth of the Department's evolving integrated airborne reconnaissance architecture incorporating results of new emerging capabilities such as real time sensor-to-shooter technology and the endurance UAVs; evaluate alternative paths for migration of current and new systems to the DARP Objective Architecture employing previously developed campaign analysis and other techniques; ensure the compatibility of the DARP

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305209D
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

- architecture with related architectures (\$3.448)
- Develop plans in conjunction with the program offices, services and users to transfer UAV capabilities to users, develop UAV operational plans and prioritize payloads (\$1.060)
- Develop assessments and complete special studies to determine the programmatic, operational and budgetary impacts of changes to UAV requirements and operational needs (\$1.009)
- Continue to direct and complete assessments of design issues for high data rate communications, Ku band communications, and 100 Megapixel equivalent IR Framing cameras (\$.927)
- Assess the impact of operational, technological and industrial requirements and changes on manned reconnaissance capabilities; update and publish the Manned Airborne Reconnaissance Program Plan to reflect necessary programmatic changes to meet future warfighter needs (\$1.368)
- Provide integration and associated engineering, and tracking support for the development of a Common Data Link (CDL), leasing of Commercial Satellite Communications Initiative (CSCI) transponders, and the development of Airborne Imagery Transmission system (ABIT) (\$1.896)
- Develop and support Advanced Development initiatives for Global Broadcast Systems, High Band Prototype Demonstrations, JASF standards development and implementation requirements, ATARS tracking , JASA High Band Prototype Insertion tracking, and HSI FOPEN development engineering support (\$4.138)
- Continue integration and configuration control, and assess the effectiveness and military worth of ACTD exercises, deployments and demonstrations, including BADD, JTUAV, MAE, and High Altitude Endurance UAVs, Roving Sands and MOBSTER (\$2.040)
- Develop airborne reconnaissance SIGINT standards and provide engineering and integration support to the SR-71, U-2 and other manned reconnaissance assets (\$1.594)
- Continue the development and maintenance of DARP oversight financial data bases and studies; develop and coordinate DARP budget justifications with executing agents, provide special studies and reports as necessary to support DARSC, EDRB, and other Departmental and Congressional requirements (\$1.572)
- Provide salaries for Civil Service employees, and provide DARO administrative, MIS, and Security support (\$3.128)

**Obligation time frame for all FY98 funding will be from Oct 98 - Dec 99**

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	February 1997
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	Defense Airborne Reconnaissance Program (DAR) PE 0305209D	

**Acquisition Strategy:** The DARP Integration and Support line funds architecture, oversight, and standardization across all areas of the DARP including manned, unmanned, infrastructure, and technology development. It consists of government civilian personnel salaries, SETA support, operations and maintenance of government facilities and equipment, security and travel support. The SETA contract was competitively awarded in September 1995 for a five year period of performance. Contract taskings are issued on a delivery order basis as required to meet the DARO's support requirements. The DARO Director's strategy for SETA support has been to place stringent restrictions on the utilization of SETA contractors, resulting in a consistent decrease in the level of funds used for this requirement. Civilian personnel costs are stabilized at the FY 1997 levels, while daily operations costs are expected to increase slightly as a result of the DARO assuming responsibility for support that had previously been funded by other activities for the DARO. These costs include DARO internet access, computer support, security, and equipment and replacement. Travel for DARO operations has remained constant and internal control procedures improved to preclude duplication of efforts and leverage analyst support across functional lines within the DARO.

**B. Program Change Summary**

	<u>FY1996 *</u>	<u>FY1997 *</u>	<u>FY1998</u>	<u>FY1999</u>	<u>Total Cost *</u>
Previous President's Budget	[18.6]**	[19.2]**			
Appropriated Value	.7***	.6***	21.5	22.2	continuing
Adjustments to Appropriated Value					
a. Undistributed Reduction					
b. Realignments					
President's Budget Request	[18.6]**	[19.2]**	20.5	22.2	continuing

\* FY 97 and prior years funding for this program are justified under PE 0305154D and recorded within the various projects supported by these activities.

\*\* Bracketed numbers are DARP Integration and Support requirements which were included as part of the individual projects in PE 0305154. Because these funds were included in the funded lines of those individual projects, the dollars are presented here for informational purposes only and are not additive for this PE.

\*\*\* These funds pay for DARO civilian pay requirements and were previously included in the Airborne Reconnaissance Programs, project P525 as a separate sub-project, DARO Operations. Since DARO civilian pay cost are now funded in this new PE (0305209D), the FY 1996 and FY 1997 DARO Operations costs were moved from the Airborne Reconnaissance Program to this program for consistency in the presentations.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305209D
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

Change Summary Explanation:

Funding: N/A

Schedule: N/A

Technical: N/A

C. Other Program Funding Summary Cost

	<u>FY1996</u>	<u>FY1997</u>	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	<u>To Complete</u>	<u>Total Cost</u>
N/A										

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	<u>FY1996 *</u>				<u>FY1997 *</u>				<u>FY1998</u>				<u>FY1999</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Contract Milestones</b>																
SETA contract subtask orders renewal																
Specialty SETA subtask renewals													X			
Specialty SETA contracts awards																X

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305209D	
RDT&E DEFENSE WIDE/BUDGET ACTIVITY 7		

**Fiscal Year actual and planned events by quarter**

\* FY 1997 and prior funding is justified as part of Program Element 0305154D.

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Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN		DATE February 1997
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305209D/P815	
RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7		

**DARP Integration & Support****A. Project Cost Breakdown**

(\$ in millions)

	<u>FY1996*</u>	<u>FY1997*</u>	<u>FY1998</u>	<u>FY1999</u>
1. Systems Engineering	[1.342]**	[1.386]**	1.500	1.544
2. Configuration Management	[5.993]**	[6.192]**	6.700	6.900
3. Technical Data	[1.700]**	[1.756]**	1.900	1.956
4. Developmental Test and Evaluation	[3.578]**	[3.697]**	4.000	4.118
5. Contractor Engineering Support	[1.176]**	[1.215]**	1.315	1.354
6. Program Management Support	[3.954]**	[4.085]**	3.420	4.551
7. Program Management Personnel	.714***	.625***	.768	.791
8. Travel	[.224]**	[.231]**	.250	.256
9. MIS and Communications Maintenance	[.394]**	[.407]**	.440	.453
10. Security	[.223]**	[.231]**	.250	.257

**TOTALS**

[18.584]**	[19.200]**	20.543	22.180
.714***	.625***		

\* FY 97 and prior years funding for this program are justified under PE 0305154D and recorded within the various projects supported by these activities.  
 \*\* Bracketed numbers are DARP Integration and Support requirements which were included as part of the individual projects in PE 0305154D. Because these funds were included in the funded lines of those individual projects, the dollars are presented here for informational purposes only and are not additive for this PE.

\*\*\* These funds pay for DARO civilian pay requirements and were previously included in the Airborne Reconnaissance Programs, project P525 as a separate sub-project, DARO Operations. Since DARO civilian pay cost are now funded in this new PE (0305209D), the FY 1996 and FY 1997 DARO Operations costs were moved from the Airborne Reconnaissance Program to this program for consistency in the presentations.

**B. Budget Acquisition History and Planning Information N/A**

This program does not meet the criteria of Chapter 5, DoD 7000.14-R